

# **NOTICE**

**All drawings located at the end of the document.**

This is a  
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EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

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**ROCKY FLATS PLANT  
EMD OPERATING  
PROCEDURES MANUAL**

**Manual No.  
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**5-21000-OPS-FO  
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**THIS IS ONE VOLUME OF A SIX VOLUME SET WHICH INCLUDES.**

**VOLUME I: FIELD OPERATIONS (FO)  
VOLUME II: GROUNDWATER (GW)  
VOLUME III: GEOTECHNICAL (GT)  
VOLUME IV: SURFACE WATER (SW)  
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**ADMIN RECORD**

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REVIEWED FOR CLASSIFICATION/UCM:

By

Date

*[Signature]*  
May 18, 1992  
*[Signature]* 5/18/92 *[Signature]*

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**TITLE  
GENERAL EQUIPMENT  
DECONTAMINATION**

**Approved By**

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats for general equipment decontamination. The collection of environmental samples requires that all equipment associated with collecting these samples be cleaned.

This requirement will ensure that contaminants will not be introduced into the sample from external sources. These procedures establish the cleaning and decontamination methods for achieving that goal.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

The EG&G project manager has the overall responsibility for implementing this SOP. The subcontractor's project manager will be responsible for assigning project staff to implement this SOP and for ensuring that the procedures are followed by all subcontractor personnel.

All personnel performing these procedures are required to have the appropriate health and safety documentation and training as specified in the site-specific Health & Safety Plan. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures, if necessary.

All project staff are responsible for reporting deviations from this SOP to the individual's project manager. The subcontractor's project manager will report deviations and nonconformances to the EG&G project manager.

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### 4.0 REFERENCES

#### 4.1 SOURCE REFERENCES

Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual U.S. Environmental Protection Agency Athens, GA. 1986

Federal Register, Volume 44, 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act"

Test Methods for Evaluating Solid Waste SW-846, 2nd Edition. U.S. Environmental Protection Agency Washington, D C 1982

Technical Enforcement Guidance Document (TEGD) EPA. 1986

#### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in these procedures are as follows.

- SOP FO 4, Heavy Equipment Decontamination
- SOP FO 7, Handling of Decontamination Water and Washwater
- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP GW.2, Field Measurement of Surface Water Field Parameters

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### 5.0 PROCEDURES AND EQUIPMENT

#### 5.1 INTRODUCTION

This procedure describes the method for physically removing contaminants. It applies to chemical and radioactive decontamination of equipment used in field investigations. All equipment must be cleaned before sample collection, decontaminated between samples, and decontaminated before being removed from the site

Sufficient clean equipment should be transported to the field so that an entire study can be conducted without the need for field cleaning. However, this is not possible for some specialized items of field equipment (such as, well drilling rigs, soil coring rigs, and other large pieces of field equipment) In addition, during particularly large-scale studies, it may not be practical or possible to transport to the field all of the cleaned field equipment required, as steam cleaning is not always possible, it may be necessary to decon smaller metal and stainless steel equipment inside the exclusion zone (see 5.3.1) in order to have these items ready for repeated use (bailers, split spoons, etc.) This will decrease the need to travel to the MDF and decontaminate these items.

The following definitions apply to the cleaning procedures:

1. The laboratory detergent must be a standard brand of phosphate-free laboratory detergent, such as Liquinox or the equivalent.
2. Tap water is defined as RFP drinking water. It may be obtained from hydrants or the RFP fire department. The use of an untreated potable water supply is not an acceptable substitute for RFP drinking water.

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The following are general comments.

- During cleaning operations, the substitution of a higher grade water (such as substituting distilled or organic-free water for tap water) is permitted and need not be noted as a variation
- The brushes used to clean equipment as outlined in the various sections of this procedure must not be of the wire-wrapped type.
- Solvents, nitric acid solution, laboratory detergent, and rinse waters used to clean equipment must not be reused, except as specifically permitted.
- Field equipment or reusable sample containers needing cleaning must not be stored with clean equipment, sample tubing, or sample containers. Field equipment, reusable sample containers, disposable sample containers, and sample tubing that are not used may not be replaced in storage without being recleaned if these materials are transported to a facility or study site where contamination or suspected contamination was present
- Previously cleaned sample containers and field equipment that are cleaned using the procedures outlined in the attachments will be stored in an area and manner that protects them from exposure to contaminants. Sample containers and field equipment will be stored separately from all other equipment and supplies, and from each other
- Sample containers that contain a sample, regardless of the assumed or known level of hazard associated with that sample, must have all exterior surfaces decontaminated. For sample containers used in areas other than a controlled

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access area, a wipedown with disposable rags or toweling, or rinse with distilled water followed by drying with disposable rags or toweling, will suffice. Any visible dirt, water droplets, stains, or other extraneous materials must be removed. For containers used in controlled access areas, a more rigorous cleaning and/or radiation monitoring may be required.

- Solvents, including water and mineral acids, used for equipment cleaning purposes other than as described in this SOP must be justified and approved by the responsible EG&G project personnel and will be documented in logbooks. The laboratory to which the samples are sent must be informed as well.

### **5.2 CLEANING PROCEDURES FOR TEFLON®, OR GLASS FIELD SAMPLING EQUIPMENT USED FOR THE COLLECTION OF SAMPLES FOR TRACE ORGANIC COMPOUNDS AND/OR METALS ANALYSES**

When this sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary to steam clean the field equipment before proceeding with Step 1. If the field equipment cannot be cleaned utilizing these procedures, it should be discarded.

- 1 Wash equipment thoroughly with laboratory detergent and tap water using a brush to remove any particulate matter or surface film.
- 2 Rinse equipment thoroughly with tap water
- 3 Rinse equipment thoroughly with distilled water
- 4 Wrap equipment with a non-reactive plastic to prevent contamination during storage and/or transport to the field.

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- 5 If the equipment is not decontaminated immediately after use, rinse the Teflon® or glass sampling equipment thoroughly with tap water in the field as soon as possible after use

### 5.3 CLEANING PROCEDURES FOR STAINLESS STEEL OR METAL SAMPLING EQUIPMENT

When this sampling equipment is used to collect samples that contain oil, grease, or other hard-to-remove materials, it may be necessary, in extreme cases, to steam clean or sandblast equipment before proceeding with Step 1. Any sampling equipment that cannot be cleaned using these procedures should be discarded. If necessary, rinsate sampling frequency and procedures are specified in the Task QAPP.

- 1 Scrape and then steam clean gross contamination if needed.
- 2 Wash equipment thoroughly with laboratory detergent and tap water and use a brush to remove any particulate matter or surface film.
3. Rinse equipment thoroughly with tap water
- 4 Rinse equipment thoroughly with distilled water
- 5 Wrap equipment with a non-reactive plastic to prevent contamination during storage and/or transport to the field.
- 6 If equipment is not decontaminated immediately after use, rinse the stainless steel or metal sampling equipment thoroughly with tap water in the field as soon as possible after use. This process will make later decontamination easier and will help prevent the spread of contamination.

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### 5.3.1 Cleaning Steel or Metal Sampling Equipment Without Steam in the Field

- 1 Scrape gross contamination from equipment while in the exclusion zone.
- 2 Remove equipment from exclusion zone and wash in laboratory detergent and distilled water, a brush may be used for particulate residual.
- 3 Double rinse in distilled water
- 4 Equipment may now either be wrapped in plastic to prevent cross-contamination or be re-used immediately

### 5.4 CLEANING PROCEDURES FOR AUTOMATIC DECONTAMINATION WATER SAMPLING EQUIPMENT

#### 5.4.1 General

Automatic samplers will be cleaned as follows.

- 1 The exterior and accessible interior portions (excluding the waterproof timing mechanism) of automatic samplers will be washed with laboratory detergent and rinsed with tap water.
- 2 The face of the timing case mechanism will be cleaned with a clean, damp cloth.
- 3 All silastic tubing (sample intake and pump tubing) will be discarded after use at site SOP FO.10 Receiving, Labeling, and Handling Environmental Materials Containers will be followed.



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- 4 New precleaned, silastic pump tubing (see Subsections 5.5.1 and 5.5.2) will be installed.
- 5 When utilizing the samplers for collecting samples for metals and/or organic compounds analyses, all sampling train components that come in direct contact with the liquid sample must be of glass, Teflon®, or disposable silastic material.

### 5.4.2 Automatic Sampler Headers

- 1 Disassemble header and, using a bottle brush, wash with tap water and phosphate-free laboratory detergent
2. Rinse thoroughly with distilled water.
- 3 Reassemble header, let dry thoroughly, and wrap with plastic.

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### 5.4.3 Reusable Glass Composite Sample Containers

Under normal circumstances reusable glass containers are supplied clean by the laboratory. When this is not the case cleaning of reusable glass composite containers will be accomplished using the procedure below.

(Note: Glass composite containers used to collect in-process decontamination water samples at industrial facilities shall be discarded after sampling.) All materials will be disposed in accordance with SOP FO 10 Receiving, Labeling and Handling Environmental Materials Containers.

1. Scrub with liquinox or other phosphate-free laboratory detergent mixed with tap water.
2. Rinse with tap water.
3. Repeat step one.
4. Rinse in tap water again, and then in a triple-distilled water rinse.
5. Dry in inverted position on drain rack or suitable rack in clean room as is applicable.
6. If equipment is still discolored, spotted, or has a noticeable film or scale, discard in accordance with SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers.

### 5.4.4 Reusable Plastic Composite Sample Containers

Under normal circumstances reusable glass containers are supplied clean by the laboratory. When this is not the case use cleaning procedures as they are outlined in Subsection 5.4.3.

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### 5.4.5 Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode)

- 1 Use cleaning procedures as they are outlined in Subsection 5.4.3
- 2 Replace bottles in covered, automatic sampler base; cover with plastic for storage

### 5.4.6 Sequential Sample Bottles (Automatic Sampler Base for Sequential Mode) to be Used for Collecting Samples for Organic Compounds Analyses

Routinely, precleaned sample bottles will be purchased and used with automatic sampling devices.

- 1 Use cleaning procedures as they are outlined in Subsection 5.4.3.
- 2 Replace in covered, automatic sampler base; cover with plastic for storage and mark the base as follows "Cleaned for organic analyses."

### 5.4.7 Bottle Siphons Used to Transfer Sample From Composite Container

- 1 Use a new siphon for each sampling location.
- 2 Use new 3/8-inch Teflon® tubing for samples collected for organic compounds analyses  
The siphon and tubing should be flushed with sample thoroughly before use.

## 5.5 CLEANING PROCEDURES FOR SAMPLE TUBING

### 5.5.1 Silastic Rubber Pump Tubing Used in Automatic Samplers and Other Peristaltic Pumps

- 1 New tubing will be used for each automatic sampler set-up

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2. Teflon® tubing should be cleaned as follows

- The exterior will be hand scrubbed with a solution of a phosphate free, laboratory grade detergent and tap water, followed by rinsing with ample amounts of tap water by spraying. The tubing will then be triple rinsed thoroughly with approved distilled water by submerging or spraying.
- Pump or pour laboratory detergent and water solution through tubing.
- Pump approved distilled water through the tubing equivalent to 10 volumes of the tubing capacity

### 5.5.2 Teflon® Sample Tubing

1. New Teflon® tubing should be used for each sampling point
2. Teflon® tubing should be cleaned as follows using the procedures of Subsection 5.5.1

### 5.5.3 Stainless Steel Tubing

1. Wash with laboratory detergent and tap water using a long, narrow, bottle brush.
2. Proceed with Steps 3.6 as outlined in Subsection 5.3

### 5.5.4 Glass Tubing

Use new glass tubing, precleaned as follows.

1. Rinse thoroughly with distilled water
2. Air dry

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- 3 Wrap tubing with plastic to prevent contamination.
- 4 Discard after use (see SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers).

### 5.6 MISCELLANEOUS EQUIPMENT CLEANING PROCEDURES

#### 5.6.1 Well Sounders or Tapes Used to Measure Groundwater Levels

The procedure applies when this equipment is cleaned in the field.

- 1 Wash with laboratory non-phosphorus detergent and tap water
- 2 Rinse with distilled water
- 3 Equipment should be wrapped with non-reactive plastic to prevent contamination during storage or transit.

#### 5.6.2 Submersible Pumps and Hoses Used to Purge Groundwater Wells

Where appropriate, pumps or bailers will be employed to purge and sample groundwater monitoring wells. This equipment will be cleaned as follows:

- 1 The external surfaces of the equipment will be vigorously hand scrubbed with a solution of a phosphate-free, laboratory grade detergent and tap water, followed by rinsing with water by submerging or spraying. The equipment will then be triple rinsed thoroughly with approved distilled water.

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2. Internal surfaces will be decontaminated by pumping a solution of non-phosphate detergent and water through the equipment.
- 3 Displace the soap solution immediately by pumping distilled water equivalent to 10 volumes of the pump storage capacity through the equipment.

### 5.6.3 Field Analytical Equipment and Other Field Instrumentation

The exterior of sealed, watertight equipment should be washed with a laboratory detergent and rinsed with tap water before storage. The interior of such equipment may be wiped with a damp cloth if necessary. Ensure that the equipment is dry prior to storage.

Other field instrumentation should be wiped with a clean, damp cloth, and pH meter probes, conductivity probes, dissolved oxygen (DO) meter probes, etc. should be rinsed with distilled water before storage.

If desiccant is present in flow meters or other equipment, it should be checked and replaced, if necessary, each time the equipment is cleaned.

For operations involving environmental or background samples, water quality sampling equipment (such as Kemmerers, buckets, DO dunkers, dredges, etc.) may be cleaned with distilled water between sampling locations. A brush may be used to remove deposits of material or sediment, if necessary. If distilled water is used, water samplers should be flushed with ambient water at the next sampling location before the sample is collected. It should be emphasized that these procedures can only be used to clean equipment used for the collection of background samples.

Flow measuring equipment (such as, weirs, staff gauges, velocity meters, and other stream gauging equipment) will be cleaned with tap water after use between measuring locations.

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### 5.6.4 Ice Chests and Shipping Containers

All ice chests and reusable containers will be steam cleaned thoroughly inside and out at MDF. If an ice chest is so contaminated it cannot be decontaminated, dispose of it in accordance with SOP FO 10, Receiving, Handling, and Labeling Environmental Materials Containers.

### 5.6.5 Uncontaminated and Potentially Contaminated Drums

Gray drums used for the temporary containment of uncontaminated or potentially contaminated solid environmental materials or environmental liquids will require decontamination prior to any additional use. It may also be necessary to decontaminate the exterior of gray drums due to radiological contamination. The following procedures will be used.

- General Procedure
  - All general gray drum decontamination will be performed at the Main Decontamination Facility (MDF)
- Ensure the drums are empty
- Scrape or shovel out any residual contaminants.
- Place drum in wash rack with open end down.
- Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position.

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- **General Decontamination**

Thoroughly steam clean all surfaces of drum including lid, locking ring, bottom, and interior surface  
A brush may be used for stubborn particulate matter

- Place top of the drum down in a clean area where it will not come in contact with contaminants to dry
- When dry, turn the drum upright and put the top and locking ring in place
- Return the decontaminated drum to EG&G.

- **Surface Radiologically Contaminated Drums**

- Stand upwind/crosswind of the surface being decontaminated. If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position, or hand brushing will be used to complete decontamination.
- Steam clean all exterior surfaces including drum bottom.
- Remove the drum to a clean area where it will not come in contact with contaminants to dry
- When the drum is dry, subcontractor personnel will monitor the drum for radiological contamination.
- If radiological contamination is still present, repeat decontamination as necessary



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- If verified free of radiological contamination by a Radiological Engineering-approved contractor Health and Safety Specialist, return the drum to the storage area.

### 6.0 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) activities will be accomplished according to applicable project plans as well as quality requirements presented in this SOP

This section outlines guidelines for specific quality control procedures to monitor the effectiveness of cleaning procedures given in the attachments.

#### 6.1 EQUIPMENT RINSE SAMPLES

The effectiveness of the equipment cleaning procedures is monitored by submitting to the laboratory rinse water for low-level analysis of the parameters of interest. Select different pieces of equipment for this procedure, each time equipment is washed, so that a representative sampling approximately 10 percent of all equipment is obtained over the length of the project. Distilled water is poured over the representative equipment. This water is captured directly into Sample bottles. If a funnel is needed, glass or Teflon® will be used.

### 7.0 DOCUMENTATION

A permanent record of the implementation of this standard operating procedure (SOP) will be kept by documenting field observations and data. Observations and data will be recorded on Form FO.3A, Equipment Decontamination/Wash Checklist and Record.

**EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD****I General Information completed by**

Name

Date

Phone No.

Subcontractor's Name

NOTE. Sections I and II will be completed by the same individual.

Equipment Manufacturer, Model and Common Name: \_\_\_\_\_

Equipment Owner \_\_\_\_\_

Name and Phone Number of Person Responsible for the Equipment. \_\_\_\_\_

Serial Number/Equipment Identification Number: \_\_\_\_\_

Delivered to Decontamination Station by: \_\_\_\_\_

Initial contaminate characterization of work area. (check one)

Not potentially contaminated \_\_\_\_\_

Potentially contaminated \_\_\_\_\_

**II Activity History**

Where was equipment used? \_\_\_\_\_

What was equipment used for? \_\_\_\_\_

Types and volumes of water generated. (check as appropriate)

\_\_\_\_\_ Purge \_\_\_\_\_ Gallons

\_\_\_\_\_ Development \_\_\_\_\_ Gallons

\_\_\_\_\_ Decon/Wash \_\_\_\_\_ Gallons

\_\_\_\_\_ Rinse \_\_\_\_\_ Gallons

**EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD****III Actions At Central Decontamination Station**

Yes	No	
_____	_____	The equipment was washed under the provisions of SOP No FO.3, General Equipment Decontamination
_____	_____	Personnel Decontamination Station established as described in the applicable site-specific health and safety plan
_____	_____	Personal protective equipment (PPE) selected based upon work area PPE level
_____	_____	Specify PPE level utilized. _____ Level B _____ Level C _____ Level D
_____	_____	PPE inspected prior to donning
_____	_____	Wind direction checked prior to using pressurized spray (circle the direction the wind was blowing from) N NE E SE S SW W NW
_____	_____	Was particular attention devoted to equipment parts that contacted potentially contaminated medium?
_____	_____	Was personal decontamination completed as described in the applicable site-specific health and safety plan?


This is a RED Stamp

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TITLE  
HEAVY EQUIPMENT  
DECONTAMINATION


Approved By

  
(Name of Approver)

MAY 12 1992  
(Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By   
Date March 4, 1992

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### LIST OF FIGURES

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the procedures and equipment that will be used at the Rocky Flats Plant (RFP) to remove contaminants that may accumulate on heavy equipment. This SOP is applicable to all operations conducted as part of the Environmental Management (EM) Program.

This SOP describes the equipment and procedures required to complete decontamination of heavy equipment.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

Radiological Engineering-approved contractor Environmental Health and Safety Specialist will perform radiation screening of all personnel and equipment leaving a work area. Screening will be performed in accordance with EG&G Radiological Operation Instruction 3.1 and screening procedures will follow Section 6.3, Contamination Monitoring of this SOP. For radiologically contaminated equipment, radiation screening will be performed following each field decontamination procedure until the equipment is free of radiological contamination or the decision is made to seal the contaminated area and transport the equipment to the central decontamination station. All radiologically contaminated heavy equipment transported to the central decontamination station will be screened by the Radiological Engineering-approved contractor Environmental Health and Safety Specialist following decontamination.

The subcontractor's project manager is responsible for ensuring that appropriate project staff and equipment are assigned to implement field decontamination, transport, and final decontamination of heavy equipment used by that subcontractor. The subcontractor's Site Safety Officer is responsible for performing Volatile Organic Compound (VOC) contamination screening of heavy equipment in accordance with the procedures given in Section 6.3, Contamination Monitoring, of

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this SOP The subcontractor's Site Safety Officer is also responsible for performing radiological monitoring during contaminant reduction of heavy equipment in the field

All personnel operating heavy equipment or company vehicles must have appropriate training and licenses

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities

NIOSH/OSHA/USCG/EPA October 1985

Nuclear Weapon Accident Response Procedures (NARP) Manual The Defense Nuclear Agency

January 1984 Change 1, July 1984

Radiological Operating Instruction (ROI) 3.1 EG&G

Standard Operating Safety Guides. EPA November 1984

Technical Enforcement Guidance Document (TEGD) EPA 1986

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### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows

- SOP FO.3, General Equipment Decontamination
- SOP FO 7, Handling of Decontamination Water and Wash Water
- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers

### 5.0 EQUIPMENT REQUIRED

### 5.1 CONTAMINATION REDUCTION IN THE FIELD

At the work site, contamination reduction will be accomplished by using the following items

- Spatula
- Stiff bristle brushes
- Long-handled shovel
- Plastic sheeting
- Absorbent wipes
- Containers for potentially contaminated media
- A trailer and tow vehicle to transport heavy equipment from work areas known or suspected of containing surficial contamination to a central decontaminating station. Procedures to limit the spread of contamination during transport are provided in Subsection 6.4



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Contamination monitoring will be accomplished using the following instruments

- Radiation detection equipment
- Organic Vapor Detector (OVD) (Hnu or equivalent)

### 5.2 MAIN DECONTAMINATION FACILITY

The most effective results will be obtained at a fixed decontamination station with provisions for ensuring that wash and rinse solutions rapidly drain away from the equipment being decontaminated and are containerized. Numerous equipment items and supplies must be furnished from various sources for the Main Decontamination Facility (MDF) to function as intended. The equipment listed below has been divided into two sections "Equipment Provided At The MDF" and "Equipment Provided By MDF Users "

#### Equipment And Supplies Provided At The MDF

- Drains, pumps, and tanks for the collection and holding of decontamination and rinse solutions
- High pressure steam cleaner and high pressure wash and rinse systems
- Sufficient potable water to be used in the high pressure cleaning systems
- Portable power generator
- Splash curtains
- Wooden pallets

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- A back-hoe or equivalent heavy equipment item outfitted with a "drum grapppler"
- A two wheeled "dolly" designed to carry 55-gallon drums
- Overpacks to be used in the event a waste container is dropped or otherwise damaged and starts to spill wastes
- Opaque, water proof sheeting
- Plastic or nylon banding and the equipment necessary to band the sheeting to waste containers
- Long and short-handled stiff bristle brushes
- Wire brushes
- Wash and rinse buckets for equipment interiors
- Premoistened towelettes
- Duct tape or equivalent
- Windsock or equivalent method for decontamination workers to determine the wind direction

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### Equipment And Supplies Provided By MDF Users

- Personal protective equipment (PPE) as required by the site-specific Health and Safety Plan
- Waste containers for used PPE, non-reusable items required to complete decontamination, and soils dislodged during decontamination
- An OVD to screen equipment and waste containers for an estimate of the effectiveness of decontamination efforts
- Radiation detection equipment
- Wash and rinse buckets necessary to establish a personal decontamination line identical to the one used at the work-site that resulted in contamination of the items being decontaminated
- Any equipment of task-specific decontamination fluids required by a SOP or SOPA but that are not listed as being available at the MDF
- Blank waste container labels to replace any completed labels that become dislodged or rendered unlegible during the decontamination process
- In addition, MDF users are responsible for arranging to have a Radiological Engineering-approved contractor Health and Safety Specialist present if required

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### 6.0 PROCEDURES

#### 6.1 INTRODUCTION

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by a Radiological Engineering-approved contractor Environmental Health and Safety Specialist. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSS's)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Area (PA)

Potentially contaminated work areas where groundwater plumes have been identified will be specified in the applicable work plans, as appropriate. Table FO 4-A1 of Appendix FO 4A lists the IHSS work areas at RFP and Figure FO 10-A1 (See SOP FO 10) shows the locations of the IHSS's. Figure FO 4-1 illustrates the identified groundwater plume areas and the americium area at OU No. 2. All other potentially contaminated work areas will be specified in the individual project work plans and/or health and safety plans.

Heavy equipment used in a work area characterized as not potentially contaminated but where environmental monitoring conducted as the work progresses indicates the presence of contamination may also become contaminated. Since such contamination is not always easily discernible, it is necessary to assume that all equipment working in an area, where the presence of such substances

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are known or suspected, has been contaminated. Effective decontamination procedures as described in this SOP will be implemented to minimize the potential for cross-contamination, offsite contaminant migration, and personnel exposure from improperly decontaminated equipment.

Heavy equipment used in an activity area characterized by EG&G as not potentially contaminated and where environmental monitoring conducted as the work progresses does not indicate the presence of contamination may be washed at a central decontamination station. Procedures established in Section 6.0 are not applicable, but Form FO 4A, Heavy Equipment Decontamination/Wash Checklist and Record, Sections I, II, and III (Attachment 1), shall be completed.

For purposes of this SOP, all equipment used during drilling/boring operations that are decontaminated at the Main Decontamination Facility (MDF) (see SOP FO.12 Decontamination Facility Operations) will be classified as heavy equipment

### 6.2 CONTAMINATION REDUCTION IN THE FIELD

Although the most effective decontamination will generally be accomplished at a dedicated decontamination station, it is always desirable to accomplish a reduction in overall contamination in the field prior to moving equipment to a dedicated decontamination station. The goal of contamination reduction is to limit contaminant migration from the exclusion zone. Contamination reduction will occur near the work site within the exclusion zone.

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Contamination reduction is accomplished by scraping, brushing, or otherwise removing as much obvious accumulation of the potentially contaminated media as possible. After the potentially contaminated media has been removed, monitoring will be accomplished by the subcontractor's Site Safety Officer. The subcontractor's Site Safety Officer will use procedures established in EG&G Radiological Operation Instructions (ROI) 3.1, Performance of Surface Contamination Surveys, to conduct radiation monitoring during contamination reduction activities in the field. Sections 10.3 and 10.4 of the referenced ROI relate specifically to conducting monitoring of potentially contaminated heavy equipment during contamination reduction activities in the field. If monitoring indicates the presence of contamination, the contaminated areas will be wiped with heavy-duty premoistened towelettes (i.e., baby wipes) if doing so may reduce contamination. Following wipe down with the premoistened towelettes, the area will be remonitored. The preceding sequence of actions will be repeated until monitoring indicates that no further reduction in contamination is occurring. The contaminated area will then be sealed as described in Subsection 6.4 and the type, amount, and location of contamination recorded on Form FO 4A. The completed Form FO 4A will accompany the equipment and be provided to the individual responsible for completing decontamination at the main decontamination facility.

In the event disposable equipment is not available and equipment must be re-used immediately, as in the case of polybuterate liners for continuous samplers, etc., a field decontamination may be set up outside the exclusion zone. A field decontamination will include the following procedures:

- Scrape gross contamination from equipment while in the exclusion zone.
- Remove the item to be decontaminated from the exclusion zone and wash in a laboratory grade detergent and tap water. A brush may be used for residual particulates.
- Rinse the item in tap water.

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- Equipment may now either be wrapped in plastic to prevent cross-contamination or be reused immediately

Substances removed during the contamination reduction process shall be handled as described in SOP FO 7, Handling of Decontamination Water and Wash Water, SOP FO 8, Handling of Drilling Fluids and Cuttings, and SOP FO 10 Receiving, Labeling, and Handling Environmental Materials Containers

### 6.2.1 Prework Activities

Limiting the amount of surfaces exposed to potential contamination is an effective method of reducing contamination. The following steps will be taken each time heavy equipment is to be used in any manner that has potential for resulting in the equipment becoming contaminated.

Once an item of heavy equipment has been taken into a potentially contaminated area, it will not normally be removed from the work area until all work that requires the presence of the equipment has been completed. Therefore care should be taken to ensure that fuel, oil, hydraulic fluid, and lubricant reservoirs are filled prior to entering the work area. For example, if "X" amount of monitoring wells are to be constructed within a given work area, then the drill rig being used will not leave the area until all drilling has been completed. Of course, augers and other like items will have to be decontaminated between bore holes. In order to reduce the potential for contamination of internal operating parts, heavy equipment will be removed from potentially contaminated areas and decontaminated if it becomes necessary to perform any maintenance on the equipment that may result in contamination of internal operating parts.

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If an enclosed cab is present, it will be lined with plastic sheeting. As a minimum, the scat(s) and floor will be covered, and the sheeting secured in such a manner that it will not become dislodged during routine use.

After arriving at a work site, any compartments, tool boxes, and enclosed cabs shall be sealed by closing the doors and windows when such fixtures are present and sealing the seams around such fixtures with tape.

When at the work site, any fuel, oil, or hydraulic fluid fill ports and air cleaners will be sealed in a manner that blocks the entrance of dusts that may be radiologically contaminated unless to do so would disable a power system required to complete the field work.

### 6.3 CONTAMINATION MONITORING

Monitoring for potential VOC contamination and potential radiological contamination will be conducted on all heavy equipment used inside work areas characterized as potentially contaminated and on all heavy equipment used inside work areas characterized as not potentially contaminated but where environmental monitoring conducted as work progresses indicates the presence of contamination.

Radiological Engineering-approved Health and Safety Specialists will screen all equipment and personnel leaving the work area to ensure that no radioactively contaminated materials leave the work area. The Radiological Engineering-approved contractor Health and Safety Specialist will use procedures established in EG&G Radiological Operation Instruction (ROI) 3.1, Performance of Surface Contamination Surveys.



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The subcontractor's health and safety representative assigned to the field team will monitor all personnel and equipment to ensure that no materials grossly contaminated with VOCs leave the area

Special attention shall be devoted to tires, tracks, and any other surfaces that have been in direct contact with the environmental media being investigated or that have been in direct contact with other items of equipment or personnel that have been in direct contact with the environmental media being investigated. Special attention shall also be devoted to any surfaces where accumulations of the environmental media being investigated exist.

### 6.4 MOVEMENT OF CONTAMINATED HEAVY EQUIPMENT

A trailer will be required to move equipment to a central decontamination station if contamination monitoring indicates contamination on surfaces such as tires or tracks or any other item which may contact the ground or become dislodged when the equipment is moved. Any trailer used to move heavy equipment to a central decontamination station will be decontaminated and the effectiveness of decontamination verified in the same manner as the equipment it was used to move.

Following field contamination reduction, equipment surface areas remaining contaminated shall be covered with plastic sheeting prior to the equipment departing the exclusion zone. Edges of the sheeting will be held in place by duct tape or a similar type tape.

Contaminated heavy equipment will not be moved at speeds greater than 5 miles per hour. Heavy equipment will not be moved over paved roads during the hours of peak traffic flow, such as the beginning or end of the work day.

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### 6.5 MAIN DECONTAMINATION FACILITY

The main decontamination facility is located adjacent to and south of the 903 Pad. Information regarding the configuration, operation, and maintenance of the central decontamination station has been prepared and may be found in SOP FO 12, Decontamination Facility Operations. The following procedures are presented in the chronological order in which they should normally occur.

#### 6.5.1 Predecontamination Procedures

- Review Form FO 4A, Heavy Equipment Decontamination Checklist and Record to determine the level of PPE required by the applicable site-specific health and safety plan and the correct decontamination procedure.
- Establish a personnel decontamination line as described in the applicable site-specific health and safety plan.
- Personal protective equipment (PPE) will be used as required in the applicable Health and Safety Plan.
- Upon arrival at the MDF, the equipment to be decontaminated and any accompanying waste containers will be set on the ground at locations that will permit one item or group of similar items at a time to be placed within the screened-in portion of the MDF.
- If radiological monitoring during the contamination reduction process documented the suspected presence of radioactive substances that could not be removed during the contamination reduction process, arrangements will be made for a Radiological Engineering-approved contractor Health and Safety Specialist to verify the effectiveness of decontamination.

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- Areas that have been sealed against exposure to the environment as required by this SOP, (due to the suspected presence of contamination that could not be removed during the contamination reduction process at the work area) will be clearly marked so that the area can be identified and monitored
- Surfaces suspected of having tightly bound contamination that could not be removed during the contamination reduction process will be decontaminated first. Procedures specified in this SOP will be followed. The MDF user will use an OVD or radiation monitor as appropriate to screen the surfaces suspected of having had tightly bound contamination. If the screening indicates the contamination has been removed, the equipment will be moved out of the MDF and returned to service only if the type of contamination that had previously been suspected was organic contamination. If the presence of radioactive contamination was suspected, the equipment will be moved out of the MDF, parked nearby, and held out of service until verification of decontamination as described in Subsection 6.5.3, Post Decontamination Procedures, has occurred.
- Verification of effectiveness of decontamination is not required for heavy equipment surfaces that were found to be contaminant free by monitoring at the work area conducted as part of the contamination reduction process.

### 6.5.2 Decontamination Procedures

- Enclosed cabs
  - Remove plastic lining/covers and dispose as contaminated waste
  - Wipe down interior surfaces

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- Use a brush to apply a detergent and water solution to the floor
- A low-pressure water hose should be used to flush the detergent and water solution from the cab
- Seal the cab by closing doors, windows, and vents
- Engine compartments
  - Although engines should not normally become contaminated, the engine area will be visually inspected for signs (e g , mud splashes) of potential contamination
  - Any dry air filters servicing equipment used in a solid waste management unit will be removed and handled as radiologically contaminated waste
  - If there are not any signs of contamination, the compartment should be left as is and sealed during decontamination of exterior surfaces
  - If there appears to be contamination present, someone familiar with the engine will employ the procedures for decontaminating exterior surfaces while avoiding damage to moisture-sensitive engine components Moisture-sensitive components may be covered with plastic during engine decontamination The components will then be hand wiped with disposable moistened towels, following general engine decontamination
  - Following engine decontamination, the engine compartment should be sealed during decontamination of exterior surfaces

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- Exterior surfaces including trailers used to move equipment to the decontamination station
  - Inspect equipment and trailers for obvious accumulation of contaminated media that can be easily dislodged by physical means (see Subsection 6 2, Contamination Reduction in the Field)
  - Use a pressurized detergent and water solution, followed by a pressurized potable water rinse
  - Stand upwind/crosswind of the surface being decontaminated If necessary the equipment will be reoriented inside the decontamination station to allow an upwind or crosswind position, or hand brushing will be used to complete decontamination
- Start at the uppermost surface and work downward including the underside of the equipment
- Pay particular attention to areas such as tires that came into contact with a potentially contaminated media and areas that show visual signs of contamination such as mud splashes on the inside of fenders or accumulations of water in a bed
- Move the equipment and decontaminate the equipment surfaces that have been in contact with the decontamination station floor
- Arrange for a Radiological Engineering-approved contractor Health and Safety Specialist to conduct a smear test as described in ROI 3 1, Performance of Surface Contamination Surveys, to verify removal of radiological contamination if such contamination had been noted on the Form FO 4A when the equipment arrived. Repeat the decontamination

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procedures for exterior surfaces if radiological contamination is found and then repeat the monitoring. If contamination is still present after completing the second decontamination procedure, contact the appropriate EG&G Construction Manager.

- Equipment
  - Items which come into direct contact with environmental samples collected for laboratory analysis will be decontaminated as described in SOP FO 3, General Equipment Decontamination. Examples of such items are sample containers.
  - Equipment used inside contaminated activity areas but that do not directly contact samples will be decontaminated by a pressurized detergent and water solution followed by a pressurized potable water rinse. Examples of such items include augers, drilling rods, and any hand tools used during drilling. Decontamination will be verified as described in Subsection 6.5.3, Post Decontamination Procedures.

### 6.5.3 Post Decontamination Procedures

- Equipment surfaces that could not be decontaminated in the field during contamination reduction activities will undergo verification of decontamination at the MDF. Verification of organic decontamination will be accomplished with an OVD by the MDF user responsible for decontaminating the equipment. Verification of radiological decontamination will be accomplished by a Radiological Engineering-approved contractor Health and Safety Specialist using the instruments and techniques specified in ROI 3.1, Performance of Surface Contamination Surveys.
- Decontaminate brushes and other reusable items of decontamination equipment as described in SOP FO.3, General Equipment Decontamination.

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- Complete personal decontamination as described in the applicable site-specific health and safety plan
- Document decontamination using Form FO 4A, Heavy Equipment Decontamination Record
- SOP FO 7, Handling of Decontamination Water and Wash Water, provides pertinent guidance which should be followed

### 7.0 DOCUMENTATION

Form FO 4A, Heavy Equipment Decontamination Record, shall be used to document information required by this SOP. Completed forms will be maintained as part of the project files. Section I of the form will be completed by the person delivering heavy equipment for decontamination. Sections III and V will be completed by the person conducting the decontamination operation.

**HEAVY EQUIPMENT DECONTAMINATION/WASH CHECKLIST AND RECORD**

I General Information completed by \_\_\_\_\_  
Name \_\_\_\_\_ Date \_\_\_\_\_

Subcontractor's Name \_\_\_\_\_

Vehicle Manufacturer, Model and Common Name \_\_\_\_\_

Equipment Owner \_\_\_\_\_

Name and Phone Number of Person Responsible for the Equipment \_\_\_\_\_

Serial Number/Vehicle Identification Number (VIN) \_\_\_\_\_

Delivered to Decontamination Station by \_\_\_\_\_

Initial contaminate characterization of work area (check one)

Not potentially contaminated \_\_\_\_\_

Potentially contaminated \_\_\_\_\_

Equipment delivered to Main Decontamination Facility on a trailer due to VOC or radiological contamination \_\_\_\_\_ Yes \_\_\_\_\_ No

Were areas found to be contaminated covered with plastic sheeting taped in-place prior to movement?

\_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_ No contamination present

II Exposure History completed by \_\_\_\_\_  
Name \_\_\_\_\_ Date \_\_\_\_\_

Subcontractor's Name \_\_\_\_\_

Where was equipment used? \_\_\_\_\_

What was equipment used for? \_\_\_\_\_

Did verified environmental monitoring indicate the presence of contamination? \_\_\_\_ Yes \_\_\_\_ No Name of person who accomplished environmental radiological monitoring in the field \_\_\_\_\_

Name	Date	Phone No	Employer's Name
------	------	----------	-----------------

Results of Radiological monitoring of equipment after final contamination reduction in the field

\_\_\_\_\_ None detected

\_\_\_\_\_ Less than 250 cpm - Specify measured cpm \_\_\_\_\_

\_\_\_\_\_ Greater than 250 cpm - Specify measured cpm \_\_\_\_\_

If areas of measurable alpha radiation were found, clearly identify those areas by providing both a written description sufficient to enable a second party to locate the area and include a sketch of the area showing its location in relation to major components of the equipment being decontaminated



Results of VOC monitoring after final contamination reduction in the field

\_\_\_\_\_ VOCs at background levels  
\_\_\_\_\_ VOCs greater than background

### III Actions At Main Decontamination Facility

NOTE Sections III and V will be completed by the person conducting the decon procedure

Yes No

- \_\_\_ \_ The equipment was washed under the provisions of SOP No FO 4, Heavy Equipment Decontamination, Subsection 6 1
- \_\_\_ \_ Personnel Decontamination Station established as described in the applicable site specific health and safety plan
- \_\_\_ \_ Personal protective equipment (PPE) selected based upon results of radiological monitoring
- \_\_\_ \_ Specify PPE level utilized \_\_\_ Level B \_\_\_ Level C \_\_\_ Level D
- \_\_\_ \_ PPE inspected prior to donning
- \_\_\_ \_ Wind direction checked prior to using pressurized spray (circle the direction the wind was blowing from)  
N NE E SE S SW W NW
- \_\_\_ \_ Enclosed cab present and decontaminated
- \_\_\_ \_ Engine compartment inspected and decontaminated as required
- \_\_\_ \_ Were decontamination and rinse operations started at the uppermost surfaces?
- \_\_\_ \_ Was particular attention devoted to areas such as tires that contacted a potentially contaminated medium and to areas identified as having a measurable level of alpha radiation?
- \_\_\_ \_ Was the equipment moved to decontaminate surfaces that had been in contact with the decontamination station floor?
- \_\_\_ \_ Was equipment used to decontaminate the heavy equipment decontaminated as described in SOP FO.3, General Equipment Decontamination?
- \_\_\_ \_ Was personal decontamination completed as described in the applicable site-specific health and safety plan?

## IV Equipment Monitoring to Verify Removal of Contamination

Name of Radiological Engineering-approved contractor Health and Safety Specialist conducting smear test as described in ROT 3 1, Performance of Surface Contamination Surveys

\_\_\_\_\_  
Name\_\_\_\_\_  
Date

Results of smear test \_\_\_\_\_

Name of person conducting VOC monitoring

\_\_\_\_\_  
Name\_\_\_\_\_  
Date

Results of VOC monitoring \_\_\_\_\_

## V Follow-up Decontamination

☐ Not Required☐ Required for the following area/surfaces\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Results of follow-up smear test \_\_\_\_\_

☐ Decontamination completed☐ Decontamination incomplete and EG&G Construction Manager notified\_\_\_\_\_  
Name\_\_\_\_\_  
Date

APPENDIX FO 4A

TABLE FO 4-A1  
ROCKY FLATS PLANT  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO</u>	<u>SITE NAME</u>
101	207 SOLAR EVAPORATION PONDS
102	OIL SLUDGE PIT
103	CHEMICAL BURIAL
104	LIQUID DUMPING
105	OUT-OF-SERVICE FUEL TANKS
	105 1 - WESTERNMOST TANK
	105 2 - EASTERNMOST TANK
106	OUTFALL
107	HILLSIDE OIL LEAK
108	TRENCH T-1
109	TRENCH T-2
110	TRENCH T-3
	TRENCHES T-4 TO T-11
	111 1 TRENCH T-4
	111 2 TRENCH T-5
	111 3 TRENCH T-6
	111 4 TRENCH T-7
	111 5 TRENCH T-8
	111 6 TRENCH T-9
	111 7 TRENCH T-10
	111 8 TRENCH T-11
112	903 DRUM STORAGE AREA
113	MOUND AREA
114	PRESENT LANDFILL
115	ORIGINAL LANDFILL
116	MULTIPLE SOLVENT SPILLS
	116 1 WEST LOADING DOCK AREA
	116 2 SOUTH LOADING DOCK AREA

Note This information is based on the administrative record including the information submitted in the hazardous and low-level mixed waste Part B application dated November 1, 1985, as modified by the subsequent revision dated November 28, 1986, as modified by the subsequent revision dated December 15, 1987, and the transuranic mixed waste Part B application submitted July 1, 1988, Thereafter referred to as the applications. This information is also based on independent review of historical aerial photographs of the facility and independent review of facility submittals.

## TABLE FO 10-A1 (cont )

## INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO</u>	<u>SITE NAME</u>
117	CHEMICAL STORAGE 117 1 NORTH SITE 117 2 MIDDLE SITE 117 3 SOUTH SITE
118	MULTIPLE SOLVENT SPILLS 118 1 WEST OF BUILDING 731 118 2 SOUTH END OF BUILDING 776
119	MULTIPLE SOLVENT SPILLS 119 1 WEST AREA 119 2 EAST AREA
120	FIBERGLASSING AREAS 120 1 NORTH OF BUILDING 664 120 2 WEST OF BUILDING 664
121	ORIGINAL PROCESS WASTE LINES
122	UNDERGROUND CONCRETE TANK
123	VALVE VAULT 7 123 1 VALVE VAULT 7 4,000 GALLON TANK #67
125	HOLDING TANK
126	OUT-OF-SERVICE PROCESS WASTE TANKS 126 1 WESTERNMOST TANK 126 2 EASTERNMOST TANK
127	LOW-LEVEL RADIOACTIVE WASTE LEAK
128	OIL BURN PIT NO 1
129	OIL LEAK
130	RADIOACTIVE SITE - 800 AREA SITE #1
131	RADIOACTIVE SITE - 700 AREA SITE #1
132	RADIOACTIVE SITE - 700 AREA SITE #4
133	ASH PITS 133 1.ASH PIT 1-1 133 2.ASH PIT 1-2 133.3.ASH PIT 1-3 133 4.ASH PIT 1-4 133.5 INCINERATOR 133 6 CONCRETE WASH PAD
134	LITHIUM METAL DESTRUCTION SITE
135	COOLING TOWER BLOWDOWN

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO.</u>	<u>SITE NAME</u>
136	COOLING TOWER PONDS
	136 1 NORTHEAST CORNER OF BUILDING 460
	136 2 WEST OF BUILDING 460
	136 3 S OF BLDG 460, W OF BLDG 444
137	COOLING TOWER BLOWDOWN - BLDG 774
138	COOLING TOWER BLOWDOWN - BLDG 779
139	CAUSTIC/ACID SPILLS
	139 1 HYDROXIDE TANK AREA
	139 2 HYDROFLUORIC ACID TANKS
140	REACTIVE METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES)
	142 1 A-1 POND
	METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES)
	142 1 A-1 POND
	142 2 A-2 POND
	142 3 A-3 POND
	142 4 A-4 POND
	142 5 B-1 POND
	142 6 B-2 POND
	142 7 B-3 POND
	142 8 B-4 POND
	142 9 B-5 POND
	142 10 C-1 POND
	142 11 C-2 POND
	142 12 NEWLY IDENTIFIED A-5 POND
143	OLD OUTFALL
144	SEWER LINE BREAK
145	SANITARY WASTE LINE LEAK
146	CONCRETE PROCESS WASTE TANKS
	146 1 7,500 GALLON TANK (#31)
	146 2 7,500 GALLON TANK (#32)
	146.3 7,500 GALLON TANK (#34W)
	146 4 7,500 GALLON TANK (#34E)
	146.5 3,750 GALLON TANK (#30)
	146 6 3,750 GALLON TANK (#33)
147	PROCESS WASTE LEAKS
	147 1 MAAS AREA
	147 2 OWEN AREA
148	WASTE SPILLS
149	EFFLUENT PIPE

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO</u>	<u>SITE NAME</u>
150	RADIOACTIVE LIQUID LEAKS (8) 150 1 NORTH OF BUILDING 771 150 2 WEST OF BUILDING 771 150 3 BETWEEN BUILDINGS 771 and 774 150 4 EAST OF BUILDING 750 150 5 WEST OF BUILDING 707 150 6 SOUTH OF BUILDING 779 150 7 SOUTH OF BUILDING 776 150 8 NORTHEAST OF BUILDING 770
151	FUEL OIL LEAK
152	FUEL OIL TANK
153	OIL BURN PIT NO 2
154	PALLET BURN SITE
155	903 LIP AREA
156	RADIOACTIVE SOIL BURIAL 156 1 BUILDING 334 PARKING LOT 156 2 SOIL DUMP AREA
157	RADIOACTIVE SITE 157 1 NORTH AREA 157 2 SOUTH AREA
158	RADIOACTIVE SITE - BLDG 551
159	RADIOACTIVE SITE - BLDG 559
160	RADIOACTIVE SITE - BLDG 444 PK LOT
161	RADIOACTIVE SITE - BLDG 664
162	RADIOACTIVE SITE - 700 AREA SITE #2
163	RADIOACTIVE SITE - 700 AREA SITE #3 163 1 WASH AREA 163 2 BURIED SLAB
164	RADIOACTIVE SITE - 800 AREA SITE #2 164 1 CONCRETE SLAB 164 2 BUILDING 886 SPILLS 164.3 BUILDING 889 STORAGE PAD
165	TRIANGLE AREA
166	TRENCHES 166 1 TRENCH A 166.2. TRENCH B 166.3 TRENCH C
167	SPRAY FIELDS - THREE SITES 167 1 NORTH AREA 167 2 POND AREA 167.3 SOUTH AREA
168	WEST SPRAY FIELD

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO</u>	<u>SITE NAME</u>
169	WASTE DRUM PEROXIDE BURIAL
170	P U & D STORAGE YARD - WASTE SPILLS
171	SOLVENT BURNING GROUND
172	CENTRAL AVENUE WASTE SPILL
173	RADIOACTIVE SITE - 900 AREA
174	P U & D CONTAINER STORAGE FACILITIES (2)
175	S&W BLDG 980 CONTAINER STORAGE FACILITY
176	S&W CONTRACTOR STORAGE YARD
177	BUILDING 885 DRUM STORAGE AREA
178	BUILDING 881 DRUM STORAGE AREA
179	BUILDING 865 DRUM STORAGE AREA
180	BUILDING 883 DRUM STORAGE AREA
181	BUILDING 334 CARGO CONTAINER AREA
182	BUILDING 444/453 DRUM STORAGE AREA
183	GAS DETOXIFICATION AREA
184	BUILDING 991 STEAM CLEANING AREA
185	SOLVENT SPILL
186	VALVE VAULT 12
187	ACID LEAKS (2)
188	ACID LEAK
189	MULTIPLE ACID SPILLS
190	CAUSTIC LEAK
191	HYDROGEN PEROXIDE SPILL
192	ANTIFREEZE DISCHARGE
193	STEAM CONDENSATE LEAK
194	STEAM CONDENSATE LEAK
195	NICKEL CARBONYL DISPOSAL
196	WATER TREATMENT PLANT BACKWASH POND
197	SCRAP METAL SITES
198	VOCs IN GROUND WATER
199	CONTAMINATION OF THE LAND SURFACE
200	GREAT WESTERN RESERVOIR
201	STANDLEY RESERVOIR
202	MOWER RESERVOIR
203	INACTIVE HAZARDOUS WASTE STORAGE AREA
204	ORIGINAL URANIUM CHIP ROASTER
205	BLDG 460 SUMP 43 ACID SIDE
206	INACTIVE D-836 HAZARDOUS WASTE TANK
207	INACTIVE 444 ACID DUMPSTER
208	INACTIVE 444/447 WASTE STORAGE AREA
209	SURFACE DISTURBANCE SOUTHEAST OF BLDG 881
210	UNIT 16, BUILDING 980 CARGO CONTAINER

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO</u>	<u>SITE NAME</u>
211	UNIT 26, BUILDING 881 DRUM STORAGE
212	UNIT 63, BUILDING 371 DRUM STORAGE
213	UNIT 15, 904 PAD PONDCRETE STORAGE
214	UNIT 25, 750 PAD PONDCRETE AND SALTCRETE STORAGE
215	UNITS 55 13, 55 14, 55 15, 55 16 - TANKS T-40, T-66, T-67, T-68
216	EAST SPRAY FIELDS 216 1 NORTH AREA 216 2 CENTER AREA 216 3 SOUTH AREA
217	UNIT 32, BUILDING 881, CN- BENCH SCALE TREATMENT



**HANDLING OF PURGE AND DEVELOPMENT WATER**

**EG&G ROCKY FLATS PLANT  
EMD MANUAL OPERATION SOP**

**Manual:  
Procedure No.:  
Page:  
Effective Date:  
Organization:**

**5-21000-OPS  
FO.5, Rev. 2  
1 of 8  
March 1, 1992  
Environmental Management**

**Category 2**

**TITLE  
HANDLING OF PURGE AND  
DEVELOPMENT WATER**

**Approved By**

*[Signature]*  
(Name of Approver)

**MAY 12 1992**

(Date)

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**REVIEWED FOR CLASSIFICATION/UCNI**

By *[Signature]*  
Date *March 14, 1992*

## HANDLING OF PURGE AND DEVELOPMENT WATER

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes the procedures that will be used for containing, moving, and emptying wastewater generated during well development at the Rocky Flats Plant (RFP)

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses

The subcontractor's site manager is responsible for coordinating the removal and transfer of all environmental materials from the project work area

The subcontractor is also responsible for moving purge and development water to holding tanks located at the central EG&G decontamination facility

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums must have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until relinquished to EG&G. These inspections will ensure that drum integrity is maintained.

## HANDLING OF PURGE AND DEVELOPMENT WATER

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Radiological Engineering-approved subcontractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave the work area

EG&G's Waste Operations personnel are responsible for the collection, movement, storage, treatment, and disposal of environmental liquids from the main decontamination facility

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure

EG&G Policies Rocky Flats Plant Use and Color Coding of Drums RFPM MAT 20-005  
November 3, 1989

Environmental Protection Agency (EPA). A Compendium of Superfund Field Operations Methods  
EPA/540/P-87/001 December 1987

RCRA Facility Investigation Guidance Interim Final May 1989

##### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are

- SOP FO.3, General Equipment Decontamination
- SOP FO 7, Handling of Decontamination Water and Wash Water
- SOP FO 8, Handling of Drilling Fluids and Cuttings

## HANDLING OF PURGE AND DEVELOPMENT WATER

EG&G ROCKY FLATS PLANT EMD MANUAL OPERATION SOP	Manual Procedure No. Page: Effective Date: Organization	5-21000-OPS FO.5, Rev 2 4 of 8 March 1, 1992 Environmental Management
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- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO 12, Decontamination Facility Operations
- SOP FO 15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO 16, Field Radiological Measurements

### 5 0 EQUIPMENT

#### 5 1 EQUIPMENT NEEDED TO HANDLE PURGE AND DEVELOPMENT WATER

The following is a list of equipment needed for the proper handling of purge and development water

- 55-gallon, open top (removable top), gray drums or liquid containers appropriately sized for the task
- Hand, electric, or gas powered pumps
- An organic vapor detector (OVD)
- A field radiation monitor
- Shovel (scoop type)
- Clear plastic sheeting for placing around the well head to prevent cross contamination of the surface

## HANDLING OF PURGE AND DEVELOPMENT WATER

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- Splash protective and personal protective equipment as required by the site-specific Health and Safety Plan

### 6.0 HANDLING OF PURGE AND DEVELOPMENT WATER

Water used during the development of an environmental monitoring well is considered purge and development water. Monitoring well development is the process by which the drilling fluids and mobile particulates are removed from within and adjacent to newly installed wells. This process can also be used to remove sediment or other built-up materials from older wells.

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved subcontractor Environmental Health and Safety Specialists. Work areas associated with the Environmental Management (EM) program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Areas (PA)

See SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers for specific work areas currently characterized as potentially contaminated. Appendix A (SOP FO 10) is a list of the IHSSs at RFP.

## HANDLING OF PURGE AND DEVELOPMENT WATER

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Solid environmental materials generated during EM field operations will be containerized as they are generated in 55-gallon or 30-gallon gray drums until associated samples are characterized. Environmental liquids will be moved to holding tanks located at the main decontamination facility (see SOP FO 12, Decontamination Facility Operations). The use of field monitors, including an OVD and radiation monitor, for the detection of volatile organics and radionuclides is discussed in SOPs FO 8, Handling of Drilling Fluids and Cuttings, FO 15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs), and FO 16, Field Radiological Measurements.

The types of contamination which may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

Regardless of the work area characterization, all purge and development water will be placed in the liquid holding tanks at the main decontamination facility. In the field, the purge and development water will be temporarily stored in 55-gallon, open top, gray drums or appropriately sized containers. Liquid containers will be marked with the words "NONPOTABLE PENDING ANALYSIS" as described in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers. Field personnel will decant the environmental liquids from one drum (or container) to another (or from a trough to a drum or transfer container) prior to moving if the amount of sludge or sediment within the environmental liquids is substantial. The residual sediment will be drummed as solid environmental materials (see SOP FO.8, Handling of Drilling Fluids and Cuttings). Characterization will be based on analytical results of the samples corresponding to the cuttings associated with the drill site.

## HANDLING OF PURGE AND DEVELOPMENT WATER

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The liquid containers will be moved to EG&G's main decontamination facility by the subcontractor. The decontamination facility will have an area specifically designed for environmental liquids. The environmental liquids area includes a process for separating solids from the liquids. The subcontractor will empty the entire container's contents into this environmental liquids area. (See SOP FO 12, Decontamination Facility Operations, for details pertaining to the environmental liquids area.)

The liquid containers will be decontaminated between each use. If gray drums are used, pertinent information regarding the use of gray drums will be documented on the Drum Field Log Form (Form FO 10A, see Section 8.0 - Documentation).

The drums containing residual sediment will be brought to the drum transfer area at the main decontamination facility and transferred to the custody of EG&G Waste Operations personnel.

Environmental liquid containers will be decontaminated between each use.

### 7.0 DECONTAMINATION

Equipment used for the development of a monitoring well located within a potentially contaminated work area will be decontaminated according to SOP FO.3, General Equipment Decontamination. If positive readings above background were detected during field monitoring within not potentially contaminated work areas, equipment will be decontaminated according to SOP FO.3.

In not potentially contaminated work areas, where no verified detections were encountered during field monitoring, the equipment used will be power sprayed and rinsed in the field in accordance with SOP FO.3, General Equipment Decontamination.

## HANDLING OF PURGE AND DEVELOPMENT WATER

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Decontamination and wash water will be disposed according to SOP FO 7, Handling of Decontamination Water and Wash Water

### 8.0 DOCUMENTATION

#### 8.1 DRUM FIELD LOG FORM

A Drum Field Log Form (Form FO 10A) will be kept on each gray drum used to move environmental liquids. The Drum Field Log Form will be used as a "cradle to grave" record. The following information will be documented on the form:

- Drum ID Number
- Date of issuance
- Location in field
- Contents
- Fill date
- Date of decontamination and location
- Date returned to EG&G

Entries made on the Drum Field Log Form may be supported with entries in a field logbook.



## DRUM FIELD LOG FORM

NAME OF THE SUBCONTRACTOR		
DRUM ID NUMBER WITH SUB ID		
DRUM ISSUE DATE		
LOCATION OF ISSUANCE		
PROJECT NAME & NUMBER		
LOCATION OF FIELD ACTIVITY		
ASSOCIATED WELL, BORING, OR		
CONTENTS OF DRUM		
SUBSURFACE INTERVALS (IF SOILS)		
ASSOCIATED SAMPLE ID NUMBERS		
DATE DRUM WAS FILLED		
SIG OF PERSON FILLING THE DRUM		
<b><u>IF SOLID ENVIRONMENTAL MATERIALS</u></b>		
LOCATION OF TEMP. STORAGE AREA		
DATE DRUM RETURNED TO EG&G		
SIG OF EG&G REPRESENTATIVE		
<b><u>IF ENVIRONMENTAL LIQUIDS</u></b>		
DATE & LOCATION WHERE CONTENTS	DATE	LOCATION
WERE EMPTIED AND DECONNED		
(e.g. 2/18/91 DECON PAD # ____)		

This is a  
**CONTROLLED DOCUMENT**  
EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT  
This is a RED Stamp

## HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

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TITLE  
HANDLING OF PERSONAL  
PROTECTIVE EQUIPMENT

Approved By

  
(Name of Approver)

MAY 12 1992

(Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By 

Date  992

## HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

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### 2.0 PURPOSE AND SCOPE

The environmental materials generated from Environmental Management (EM) field activities will be handled in accordance with the Rocky Flats Plant (RFP) EM program. This standard operating procedure (SOP) describes procedures that will be used by subcontractors at RFP to handle disposable personal protective equipment (PPE). These procedures are intended to be sufficiently detailed so that conformance with them will result in reliable handling and management of PPE used during EM field activities.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training or licenses.

The subcontractor's site manager is responsible for coordinating the removal and transfer of all environmental materials and refuse from the project work area.

Disposable PPE considered not contaminated (see Section 6.3) will be bagged, sealed, labeled, and placed in designated cargo containers in the EM contractor's yard by the subcontractor's personnel. EG&G personnel will dispose the contents of the cargo containers at the landfill. PPE suspected of containing radioactive and/or hazardous substances will be bagged, sealed, labeled, and placed in a cargo container in the contamination reduction zone specifically designated for potentially contaminated disposable PPE. All PPE or other disposable materials will be characterized with field instruments prior to bagging. Under no circumstances will an unlabeled plastic bag be placed in either the not contaminated or the potentially contaminated cargo container. An accompanying COC will be filled out by the subcontractor in duplicate. At the time the PPE is turned in the EG&G representative will sign the COC and return one copy to the subcontractor. Hours for PPE collection will be set by the EG&G representative.

## HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

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Radiological Engineering-approved subcontractor Health and Safety Specialists are responsible for conducting organic vapor and radiation screenings of equipment, samples, PPE, and personnel before they leave potentially contaminated work areas

EG&G's personnel are responsible for the collection, movement, storage, treatment, and disposal of solid environmental materials from the cargo containers in the contractor's yard

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987

Rockwell International Policies, Rocky Flats Plant, Use and Color Coding of Drums RFPM MAT 20-005 November 3, 1989

##### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows

- SOP FO 2, Field Document Control
- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO 12, Decontamination Facility Operations

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- SOP FO 15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO 16, Field Radiological Measurements

### 5.0 EQUIPMENT

The following items are required for handling disposable PPE

- Large clear plastic garbage bags (3 mil)
- Duct tape
- Computer generated adhesive labeling for plastic bags

### 6.0 PROCEDURES FOR HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil, surface water, and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved subcontractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Area (PA)

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SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers, lists the IHSS work areas at RFP and illustrates the identified groundwater plume areas and the americium area at OU No 2. All other work areas considered potentially contaminated will be specified in the Work Plan and/or Health and Safety Plan.

Field monitoring, including organic vapor detectors (OVDs) and radiation monitors, will be used during all intrusive activities regardless of the work area characterization. Field monitoring for non-intrusive activities (e.g., surface water sampling) will include radiation monitoring prior to leaving potentially radiologically contaminated areas. PPE generated during EM field operations will be handled depending on the results of the field monitoring. Disposable PPE worn in work areas that are characterized as potentially radiologically contaminated will be screened by Radiological Engineering-approved subcontractor Health and Safety Specialists to determine if the PPE is potentially contaminated. An alpha detector (such as the Ludlum 12-1A with an air proportional probe or an equivalent instrument) will be used to screen PPE and other disposable materials when these materials are dry. When these materials are wet, a Bicon Analyst Fidler (or equivalent instrument) will be used for an initial screening. If a positive reading is encountered, the materials are potentially contaminated and will be handled according to Section 6.2 of this SOP. If no positive reading is encountered when using the Bicon Analyst Fidler (or equivalent), representative samples of the materials or smears will be taken.

After the samples or smears have been taken, wet PPE will be removed within a personal decontamination line at the work area (see Section 6.2). Each worker's PPE will be placed in individual 3 mil plastic bags until the sample or smear results are determined. The individual bags will be sealed and labeled with the same identifying markings as the associated samples or smears.

The samples and smears will be counted using scaler rate meters (e.g., SACA, BCA, or equivalent instruments). If the scaler meters indicate the presence of residual radioactive materials above 20 disintegrations per minute (dpm) on any of the samples or smears, the associated plastic bags will

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be placed into 3 mil plastic bags, sealed and labeled as described in Section 6.2, Handling of Potentially Contaminated PPE. The remaining 3 mil plastic bags that had non-radioactive samples and smears will be combined into 3 mil plastic bags. The bags will be sealed and labeled as not contaminated PPE (see Section 6.2).

Disposable PPE worn in not potentially contaminated work areas but where a positive reading was detected on a field monitor will also be screened to determine if the PPE is potentially contaminated. The use of field monitors for the detection of volatile organics and low-level radioactively contaminated substances is discussed in SOP FO 15, Use of Photoionization Detectors and Flame Ionization Detectors, and SOP FO 16, Field Radiological Instruments.

The subcontractor's site manager is responsible for implementing disposable PPE management procedures established by this SOP and procedures referenced in this SOP.

These duties include

- Consulting with the EG&G EM project manager to resolve any questions concerning the characterization of a work area.
- Properly using field monitors during EM activities.
- Placing bags containing not contaminated PPE (i.e. PPE worn in not potentially contaminated work areas where no verified positive field monitor readings were encountered or, PPE that has been screened by a Radiological Engineering-approved subcontractor Health and Safety Specialist and found to be not contaminated) in designated the not contaminated cargo containers in the EM contractor's yard.

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- Providing, and filling out COC forms and Adhesive labels
- Attaching adhesive labels to bags of PPE
- Ensuring that plastic bags containing potentially contaminated PPE (i.e. PPE that has been screened by Radiological Engineering-approved subcontractor Health and Safety Specialists and a verified positive field monitor reading was encountered during the screening process) is placed in the appropriate (potentially contaminated) cargo container in the contamination reduction zone located east of the decontamination pad. Potentially contaminated PPE will not be commingled with not contaminated PPE

### 6.1 PERSONAL PROTECTIVE EQUIPMENT

PPE is generally defined as clothing or equipment required to be worn by the site-specific Health and Safety Plan (HSP) in order to limit worker's exposure to physical, chemical or radiological health hazards. Any questions regarding whether a given item is considered to be PPE for the purposes of disposal should be directed to the site safety officer.

All disposable PPE worn in a work area characterized as potentially contaminated will be screened by a Radiological Engineering-approved subcontractor Health and Safety Specialist. In not potentially contaminated work areas where a positive reading was detected on either the OVD or the field radiation monitor, PPE will also be screened. Potentially contaminated PPE is any PPE where a verified positive reading was encountered during the screening process.

If no verified positive reading was encountered during the screening process, disposable PPE will be considered not contaminated. In not potentially contaminated work areas where no positive reading was detected on the field monitors, PPE will be considered not contaminated.



## HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

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In general, the site-specific HSP will describe the PPE to be worn, as well as methods of decontaminating disposable and reusable PPE, such as respirators. In general, plastic bags are prescribed for use in the personal decontamination line to contain discarded PPE.

### 6.2 HANDLING OF POTENTIALLY CONTAMINATED PPE

Disposable PPE will be considered potentially contaminated if the screening process conducted by Radiological Engineering-approved subcontractor Health and Safety Specialists indicates that the PPE may be potentially contaminated (i.e. a verified positive reading is detected on either the OVD or the field radiation monitor). Workers will establish a personal decontamination line in accordance with the site-specific HSP and will place their PPE in double bagged 3 mil plastic bags while going through the decontamination line. If the PPE is wet an alpha detector will not be able to detect the presence of radioactive substances. Therefore, a Bicron Analyst Fidler (or equivalent instrument) will be used to initially screen for radiologically contaminated PPE and representative samples or smears will be taken (see Section 6.0).

The following procedures will be used to handle potentially contaminated PPE from containers used in a personal decontamination line:

- If respiratory protection was required during the field activity, the last person through the decontamination line will continue to wear the respiratory protection until removal is indicated in these procedures.
- The last person will process through the decontamination line just as the preceding workers.
- After all PPE items have been removed and placed in the clear plastic bags, the plastic bags can be processed.

## HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

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- The last worker will don a fresh pair of gloves before handling the plastic bags containing PPE at the last decontamination station. The plastic bags containing the discarded potentially contaminated PPE will then be removed from the container, the bags will be compressed in a downwind direction, and the compressed bags will be sealed with duct tape.
- While still wearing the respirator and the fresh pair of gloves, the worker will remove the sealed plastic bags containing PPE from the containers along the decontamination line.
- Where possible, the individual bags of potentially contaminated PPE will be combined into clear 3 mil plastic bags, sealed with duct tape, and marked with a waterproof marker. If it is not possible to combine individual bags into a single bag, each individual bag will be sealed and marked.
- The respirator may be removed after all disposable, potentially contaminated PPE bags have been sealed. The respirator cartridges and gloves will also be removed and placed inside a plastic bag, sealed, and marked.
- Marking for the double 3 mil bags (on the adhesive label) will include the characters "PPE", the associated well, borehole, trench designation, or sample number and location, date, and either "RADs NOT DETECTED" or "RADs DETECTED (# of counts detected)" as appropriate.
- The plastic bags will be turned into an EG&G representative along with the proper COC documentation, then placed in cargo containers designated for potentially contaminated PPE located in the contamination reduction zone located east of the decontamination pad until characterized.

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- In no instance will an unmarked bag be placed in a cargo container

### 6.3 HANDLING OF NOT CONTAMINATED PPE

PPE will be considered not contaminated if the work area is characterized as not potentially contaminated and no verified positive reading was detected on either the OVD or the field radiation monitor during tasked activities. PPE that has been screened by a Radiological Engineering-approved subcontractor Health and Safety Specialist where no positive readings were encountered will also be considered not contaminated.

Not contaminated, disposable PPE will normally be handled as ordinary refuse. Disposable PPE and uncontaminated miscellaneous solid environmental materials will be placed in double bagged 3 mil plastic bags at the work area. When full, these plastic bags will be sealed and marked as described in Subsection 6.2.1. These bags will be labeled with an adhesive sticker and turned into the EG&G representative with the appropriate COC forms then placed in designated cargo containers located in the contractor's yard. The contents of these cargo containers will be disposed of in the landfill by EG&G personnel.

### 7.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Observations and data will be recorded on field log forms. Form FO.8A will be used to document field monitoring results. Forms FO.8B, and FO.16A are also used to verify initial readings above background. It is important to annotate on the field log forms all of the sample locations and sample numbers of the activities for which the PPE was worn. Subcontracting personnel may also choose to document the observations and data in a personal field notebook in addition to the field log forms. If a field book is used, entries should be made with a

## HANDLING OF PERSONAL PROTECTIVE EQUIPMENT

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black waterproof ink pen The field notebook should be waterproofed and have consecutively numbered pages All project files will be turned over to EG&G at this time (see SOP FO 2, Field Documentation)



## FIELD MONITORING RESULTS

1 Project Location \_\_\_\_\_ Site Number \_\_\_\_\_ Date \_\_\_\_\_

#### 4 SAMPLE MEASUREMENTS (Continued)

[illegible]

If any OVD or RAD measurements are above background measurements, forms FO.8A and/or FO 16A must be completed for verification

Completed By \_\_\_\_\_

Subcontractor \_\_\_\_\_

## RESULTS OF RADIOLOGICAL MEASUREMENTS IN THE FIELD

**Project Name** \_\_\_\_\_

Date \_\_\_\_\_ Site Number \_\_\_\_\_

**Snow Cover Present (Y/N) \_\_\_\_\_ Work Surface Wet (Y/N). \_\_\_\_\_**

## 1 Instruments Used and Background Readings

Manufacturer and Model No	Serial Number	Probe Type	Probe Serial No	Calibration Due Date	Background Reading (cpm)

## 2 Prewrite Monitoring Results (Ludlum 12)

\_\_\_\_\_ cpm at Point of Intrusive Activity      \_\_\_\_\_ Highest Measured cpm

### 3 Sample Monitoring Intervals Monitored and Associated Samples

[illegible]

**Completed By** \_\_\_\_\_  
**Print Name**                      **Signature**                      **Date**

Subcontractor \_\_\_\_\_

This is a  
**CONTROLLED DOCUMENT**

EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

This is a RED Stamp      **HANDLING OF DECONTAMINATION WATER AND WASH WATER**

**EG&G ROCKY FLATS PLANT  
EMD MANUAL OPERATION SOP**

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HANDLING OF DECONTAMINATION  
WATER AND WASH WATER**

**Approved By**



**MAY 12 1992**

(Name of Approver) (Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By

Date



## HANDLING OF DECONTAMINATION WATER AND WASH WATER

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### **2.0 PURPOSE AND SCOPE**

This standard operating procedure (SOP) describes procedures that will be used by subcontractors at Rocky Flats to handle decontamination water and wash water used during Environmental Management (EM) field activities

### **3.0 RESPONSIBILITIES AND QUALIFICATIONS**

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses

The subcontractor's site manager is responsible for coordinating the removal and transfer of all solid environmental materials from the project work area

The subcontractor is also responsible for moving environmental liquids to holding tanks located at the central EG&G decontamination facility

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums must have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until relinquished to EG&G. These inspections will ensure that drum integrity is maintained.

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Radiological Engineering-approved subcontractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave the work area

EG&G's Waste Operations personnel are responsible for the collection, transport, and storage of solid environmental materials from the drum transfer area and environmental liquids at the main decontamination facility

#### 4 0 REFERENCES

#### 4 1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure

EG&G Use and Color Coding of Drums Policies Rocky Flats Plant RFPM MAT 20-005  
November 3, 1989

Environmental Protection Agency (EPA) A Compendium of Superfund Field Operations Methods  
EPA/540/P-87/001 December 1987

RCRA Facility Investigation Guidance Interim Final May 1989

#### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows

- SOP FO.3, General Equipment Decontamination
- SOP FO 4, Heavy Equipment Decontamination

## HANDLING OF DECONTAMINATION WATER AND WASH WATER

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- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO 12, Decontamination Facility Operations
- SOP FO 15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO 16, Field Radiological Measurements

### 5.0 EQUIPMENT

The minimum equipment needed to handle decontamination water or wash water are the following:

- Truck or trailer with enclosed sides for moving liquid waste containers
- Personal splash protection equipment
- Pump (hand or peristaltic)
- Gray drums or other liquid waste containers
- Drum handling equipment (if drums are used)

### 6.0 WORK AREA CHARACTERIZATIONS

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved subcontractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

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- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No 2
- Protected Areas (PA)

See SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers for specific work areas currently characterized as potentially contaminated

The types of contamination that may be encountered within potentially contaminated work areas include the following:

- Low-level radioactively contaminated substances
- Nonradioactive RCRA regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

### 6.1 HANDLING OF DECONTAMINATION WATER AND WASH WATER

Decontamination water is soapy or clear water used for cleaning and rinsing equipment, personnel, samples, or vehicles used in work areas characterized as potentially contaminated or in not potentially contaminated work areas, where verified positive detections above background were encountered during field monitoring. The water used to clean equipment used during drilling activities, regardless of the work area characterization, will be considered decontamination water

Wash water is soapy or clear water used to clean equipment, personnel, samples, or vehicles used at work areas characterized as not potentially contaminated where no verified positive readings above background were detected during field monitoring.

## HANDLING OF DECONTAMINATION WATER AND WASH WATER

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If a work area is characterized as not potentially contaminated but verified results from field monitoring indicate the presence of previously unsuspected contaminated substances, the water used for cleaning equipment, personnel, samples, and vehicles is considered decontamination water

### 6 1 1 Handling of Decontamination Water

Decontamination water will be contained by the subcontractor in gray 55-gallon drums, 30-gallon drums or liquid containers. The drums will be taken by the subcontractor to the main EG&G decontamination facility. The decontamination facility will have an area specifically designed for environmental liquids disposal (see SOP FO 12, Decontamination Facility Operations for details pertaining to the environmental liquids area). The subcontractor will empty the entire drum's contents into this area.

Other considerations to ensure the proper handling of decontamination water are

- Due to high phosphate levels, Alconox will not be used. Liquinox or a phosphate-free equivalent will be used.
- Decontamination water used by subcontracting personnel must be replaced at least once daily regardless of the contamination level. Replacement may be required more than once a day, depending on field conditions (i.e., heavy mud or organic or radioactive contaminants).
- Use gray, 55-gallon, or 30-gallon open top (removable top) drums or environmental liquids containers appropriately sized for the task to move decontamination water.

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- Liquid container lids will be secured and containers will be moved in trucks with enclosed sides
- Mark the liquid containers used for moving environmental liquids with the words "NONPOTABLE PENDING ANALYSIS" as described in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- Document the use of gray drums for moving environmental liquids on the Drum Field Log Form (Form FO 10A, see Section 8 0 - Documentation )
- Decontaminate containers used to move environmental liquids after emptying them (See SOP FO 3, General Equipment Decontamination )
- No containers with holes, leaks, or bad seals will be used for moving decontamination water
- Proper "splash" protection must be used while handling fluids (see SOP FO 4, Heavy Equipment Decontamination )

### 6.1.2 Handling of Wash Water

For surface water field activities in areas characterized as background stations (uncontaminated) (see site specific work plan and/or health and safety plan) wash water and rinse water will be disposed of on the ground at least 50 feet from the sampling location such that the waste water cannot discharge into any stream, pond, or other surface water impoundment.

Wash water used to clean equipment, personnel, and vehicles during surface soil sampling, groundwater sampling and post drilling grout mixing activities in work areas characterized as not

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potentially contaminated where no verified positive reading were detected on field monitors will be disposed of approximately 50 feet from the sampling location. The disposal location must be at least 200 feet from any stream drainage.

### 7.0 DECONTAMINATION

Decontamination of equipment used to handle and move decontamination water will be done in accordance with SOP FO 4, Heavy Equipment Decontamination and SOP FO.3, General Equipment Decontamination, and will be done between work areas so as not to promote cross-contamination of work areas. Equipment and containers used for handling wash water will be power sprayed and rinsed.

### 8.0 DOCUMENTATION

#### 8.1 DRUM FIELD LOG FORM

If gray drums are used for moving environmental liquids, a Drum Field Log Form (Form FO 10A) will be filled out in order to maintain a "cradle to grave" record. Information on the Field Drum Log Form includes:

- Drum ID number
- Date of issue
- Location in field
- Contents
- Fill date
- Date of decontamination and area location
- Date returned to EG&G

## HANDLING OF DECONTAMINATION WATER AND WASH WATER

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Any damage incurred to a drum either during shipping or handling will be reported to an EG&G representative as soon as possible for immediate correction

Entries made on the Drum Field Log Form may be supported with entries in a field logbook



## DRUM FIELD LOG FORM

NAME OF THE SUBCONTRACTOR		
DRUM ID NUMBER WITH SUB ID		
DRUM ISSUE DATE		
LOCATION OF ISSUANCE		
PROJECT NAME & NUMBER		
LOCATION OF FIELD ACTIVITY		
ASSOCIATED WELL, BORING, OR		
CONTENTS OF DRUM		
SUBSURFACE INTERVALS (IF SOILS)		
ASSOCIATED SAMPLE ID NUMBERS		
DATE DRUM WAS FILLED		
SIG OF PERSON FILLING THE DRUM		

<b><u>IF SOLID ENVIRONMENTAL MATERIALS</u></b>		
LOCATION OF TEMP STORAGE AREA		
DATE DRUM RETURNED TO EG&G		
SIG OF EG&G REPRESENTATIVE		

<b><u>IF ENVIRONMENTAL LIQUIDS</u></b>		
DATE & LOCATION WHERE CONTENTS WERE EMPTIED AND DECONNED (e g 2/18/91 DECON PAD # ____)	DATE	LOCATION

**HANDLING OF DRILLING FLUIDS AND CUTTINGS**

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 AND CUTTINGS**

**Approved By**

*[Signature]*  
 (Name of Approver)

**MAY 12 1992**

(Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By *[Signature]*

Date *March 4, 1992*

## HANDLING OF DRILLING FLUIDS AND CUTTINGS

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) will be used at the Rocky Flats Plant (RFP) to describe the proper methods to control, contain, and handle drilling fluids and cuttings

This SOP describes the handling of drill cuttings and drilling fluids and the use of organic vapor detectors (OVDs) and radiological screening for field monitoring.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses

The subcontractor's site manager is responsible for the proper handling of all materials generated during drilling activities

The subcontractor is responsible for drumming drill cuttings. Drums containing drill cuttings will be transferred to the custody of EG&G Waste Operations only after the drums' contents have been characterized and the drums have passed inspection. Characterization will be based on analytical results of the samples corresponding to the cuttings associated with the drums' contents and the EG&G Hazardous Waste Requirements Manual (HWRM)

The subcontractor is also responsible for moving environmental liquids associated with EM drilling activities to holding tanks located at the main EG&G decontamination facility

It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of

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damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums will have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of all the drums issued to the subcontractor until the drums are relinquished to the custody of EG&G Waste Operations. These inspections will ensure that drum integrity and drum labeling is maintained.

Radiological Engineering-approved subcontractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave potentially contaminated work areas.

EG&G's Waste Operations personnel are responsible for the collection, transport, and storage, of solid environmental materials from the drum transfer area and environmental liquids from the decontamination facility.

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

EG&G Hazardous Waste Requirements Manual (HWRM) June 1991.

EG&G On-Site Transportation Manual 1991

EG&G Policies, Rocky Flats Plant, Use and Color Coding of Drums RFPM MAT 20-005  
November 3, 1989

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Environmental Protection Agency (EPA) A Compendium of Superfund Field Operations Methods  
EPA/540/P-87/001 December 1987

Hall, Ridgway M Jr , Tom Watson, Jeffrey J Davidson, David R Case, Nancy S Bryson RCRA  
Hazardous Wastes Handbook 6th Edition Government Institutes, Inc. Rockville, MD March 1986

National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health  
Administration (OSHA), U S Coast Guard (USCG), and U.S Environmental Protection Agency  
(EPA) Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities  
October 1985

### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows

- SOP FO 3, General Equipment Decontamination
- SOP FO 4, Heavy Equipment Decontamination
- SOP FO.5, Handling of Purge and Development Water
- SOP FO 6, Handling of Personal Protective Equipment
- SOP FO 7, Handling of Decontamination Water and Wash Water
- SOP FO 9, Handling of Residual Core and Laboratory Samples
- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO 12, Decontamination Facility Operations
- SOP FO 15, Use of Photoionizing Detectors and Flame Ionizing Detectors
- SOP FO 16, Field Radiological Measurements
- SOP GT 2, Drilling and Sampling Using Hollow-Stem Auger Techniques

## HANDLING OF DRILLING FLUIDS AND CUTTINGS

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### 5.0 EQUIPMENT

The following items will be required during most field operations that generate drilling fluids and cuttings

- Gray, 55-gallon drums, Type 17C
- Gray, 30-gallon drums, Type 17C
- Rigid liner for drums
- Shovels and scoops with nonporous surfaces to facilitate decontamination
- Paint stick for marking drums
- Organic vapor detector (OVD)
- Field radiation monitor
- Drum bung wrench
- Tools for opening and sealing open-top 55-gallon or 30-gallon drums with a clamp-type sealing band
- Pallets
- Opaque weather-proof sheeting
- Hand pressurized sprayer
- Desiccant
- If drilling muds are used, a seamless container (such as a molded plastic type) will be used for decanting fluids from residual sediments
- Personal Protective Equipment (PPE) as specified in the Site-Specific Health and Safety Plan
- A heavy equipment forklift or truck equipped with a drum grapppler and capable of lifting a 55-gallon or 30-gallon drum containing solid or liquid materials

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### 6.0 CONTAMINANT CHARACTERIZATION

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil and groundwater analyses and the results of field radiological surveys conducted by Radiological Engineering-approved contractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Areas (PA)

A listing and locator map of all known Individual Hazardous Substance Sites (IHSS) has been included in Appendix FO 10A of SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers.

Drill cuttings generated during EM field operations will be handled by containerizing them in 55-gallon or 30-gallon gray drums as they are generated. Environmental liquids generated during EM field operations will be containerized in 55-gallon, gray, closed top drums or appropriately sized containers. The liquid containers will be moved to the environmental liquids area at the main decontamination facility.

The use of field monitors for the detection of volatile organics and radionuclides is discussed in SOP FO 15, Use of Photoionizing Detectors and Flame Ionizing Detectors, and SOP FO 16, Field Radiological Measurements and their use is defined in the Health and Safety Plan (HSP).

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The types of contamination that may be encountered within potentially contaminated work areas include the following

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

### 6.1 PREDRILLING PROCEDURES

Predrilling procedures will be conducted prior to drilling a well or boring regardless of the work area characterization. Drilling procedures include the following:

- Subcontracting personnel will conduct a radiological screening (see SOP FO 16, Field Radiological Measurements) of the ground surface prior to any drilling activity
- The surface soil around the staked boring or well location will be wetted with distilled water from a hand-pressurized spray bottle. The wetting will be sufficient to preclude dust generation during the soil removal process
- The subcontractor personnel will use a shovel to remove a depth of approximately 8-inches of soil from an arc of sufficient size to allow for approximately 2 inches of clearance on each side of the auger. The wet soil will be spread over the ground near the drilling site. Drilling activities may now begin. The shovel will be decontaminated between work areas



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### 6.2 DRILLING PROCEDURES

The auger will be positioned approximately in the center of the 20-cm-deep excavation to begin drilling. If significant dust is generated during drilling operations, cuttings will be wetted with distilled water from a hand-pressurized sprayer and placed on the ground. Cuttings that are moist need not be sprayed.

An OVD and a field radiation monitor will be used to screen core or cuttings to determine if hazardous or radioactive substances are present so that the proper PPE is selected in order to comply with the HSP. In work areas requiring a radiological work permit and an Integrated Work Control Permit with an appropriate work package, a Radiological Engineering-approved subcontractor Health and Safety Specialist will be contacted to radiologically monitor the equipment and PPE at the end of each day's drilling activities. The equipment and PPE will be handled per SOP FO 4, Heavy Equipment Decontamination and SOP FO 6, Handling of Personal Protective Equipment.

### 6.3 FIELD MONITORING

OVD and field radiological screenings will be conducted by the subcontractor within each work area for all intrusive activities to ensure safety and to determine the proper PPE to be worn by all workers. The OVD and field radiological monitors will be used as described in SOP FO 15, Use of Photoionizing Detectors and Flame Ionizing Detectors, and FO 16, Field Radiological Measurements. For the purposes of this SOP, the following procedures apply:

- Prior to the start of work, measure the organic vapor and radioactive background level on the upwind side of the activity area. Record the results on Form FO 8A, Field Monitoring Results of Cuttings or Core. (This form will be used to record all readings taken on cutting or core.)

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- Monitor the borehole for organic vapors and radiological contaminants where the intrusive work is occurring. The results of monitoring shall be recorded on Form FO 8A. When hollow-stem augers are being used, monitor inside the auger each time the drive head is removed. When solid-stem augers are being used, monitor the cuttings at ground level each time the auger is stopped.
- If the cuttings or core are wet, smears will be taken to monitor the presence of radioactive materials. Document that a smear was taken and the smear number on Form FO 8A. Smear results will be documented on Form 11B in the Environmental Management Radiological Guidelines (EMRGs), Manual No 3-21000-OPS-EMRG.
- Single OVD or field radiological measurements greater than the background measurement may indicate the presence of hazardous or radioactive substances and must be verified as described in Subsection 6.3.1.
- When an OVD or field radiological measurement above background is detected, all intrusive work will stop until the verification procedures are complete.

### 6.3.1 Verified Positive Readings

The following verification procedures will be used after detecting an initial OVD or radiological measurement greater than the background measurement. The verification process will be recorded on Form FO 8B, Verification of Organic Vapor Monitoring Results, and Form FO 16A, Results of Radiological Monitoring in the Field.

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- For an OVD reading above background, turn off any diesel- or gasoline-driven engines operating within the vicinity of the work area since most OVDs will detect incomplete combustion by-products
- Remove the instrument (OVD or field radiological) from the work area and make an upwind measurement of ambient organic vapor levels or radioactivity, as appropriate
- That measurement will be followed by a remeasurement at the same location where the positive measurement was recorded
- If the remeasurement is not above background, repeat the preceding actions for a third measurement and record the results
- If any two of the three measurements (including the original measurement) indicate organic vapor levels or radioactivity greater than the background level, the original measurement has been verified. Record the final results on Form FO.8A as well as the verification forms

### 6.4 INVESTIGATIVE MATERIALS

#### 6.4.1 Handling Drill Cuttings

Drill cuttings will be contained in gray drums with a liner (See SOP FO 10 Receiving, Labeling, and Handling Environmental Materials Containers, Section 6.3.2) regardless of the work area characterization. Prior to the filling of the drum, two liters of desiccant will be placed in the bottom of the drum and two additional liters will be put into the drum when the drum has been filled half full. Cuttings will be placed in the drum up to approximately two inches from the top.

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After filling, these gray drums will be sealed, marked, and placed on a leveled pallet at the drilling site. Once the laboratory analytical results of the environmental samples have been received they will be assessed by EG&G. If the drum's contents are determined to be uncontaminated or pose no risk, the contents will be disposed of in the landfill. If the drum's contents are determined to contain hazardous substances, mixed substances, or radioactive substances, the drums will be painted the appropriate color corresponding to the characterization of the drum's contents, labeled appropriately (See SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers), and stored by EG&G Waste Operations according to the proper SOPs contained in the HWRM and the On-Site Transportation Manual.

Drilling cuttings generated from drilling shot holes for geophysical probes will be placed back in the original excavation and not contained in drums.

### 6.4.2 Handling Drilling Fluids

If drilling fluids are to be used, the entire pumping system will be checked for leaks before the pumping system is taken to the work area. Checking will consist of assembling the system and pumping potable quality water through it. If a leakage in the hose connections or elsewhere is detected, it will be repaired before being used.

If a drilling fluid system being used at a drill site develops a significant leak that will result in the potential contamination of the surficial soils, the system will be shut down and repaired within the work area, if feasible. If repairs are not feasible within the work area, the drill rig will be removed from the work area and decontaminated before it is repaired (see SOP FO 4, Heavy Equipment Decontamination).

Drilling fluids will be contained in 55-gallon or 30-gallon, gray, closed top drums or appropriately sized containers. Field personnel should decant the environmental liquids from one drum (or

## HANDLING OF DRILLING FLUIDS AND CUTTINGS

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container) to another (or from a trough to a drum or container) prior to moving if the amount of sediment within the environmental liquids is substantial. The residual sediments will be placed in gray drums according to Section 6.4.1 of this SOP. The environmental liquid containers will be moved to the environmental liquids area at the main decontamination facility. (See SOP FO 12, Decontamination Facility Operations for details pertaining to the environmental liquids area.) Environmental liquid containers will be marked and moved as described in SOP FO.10, Receiving, Labeling, and Handling Environmental Materials Containers. The liquid containers will be emptied by the subcontractor into the decanting tanks at the decontamination facility.

### 7.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Form FO 8A, Field Monitoring Results of Cutting or Core is provided to assist in the documentation of the field monitoring. As described in Subsection 6.3, Form FO 8A and/or FO 16A will be used, in addition to the Form FO 8B to validate any initial OVD or RAD measurement greater than background. Results of the field radiological monitoring will be documented in accordance with SOP FO 16, Field Radiological Measurements. Form FO 14C, Record of Drilling Fluids and Cuttings will be used (one form per borehole/well location) to document the source of drilling cuttings and corresponding OVD and RAD results.

Additionally, drums issued to a subcontractor by EG&G will have an associated Drum Field Log Form (FO 10A) and a Contaminant Characterization Form (FO 10C) as discussed in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers.

## FIELD MONITORING RESULTS OF CUTTINGS OR CORE

**1 Project Location** \_\_\_\_\_ **Site Number** \_\_\_\_\_ **Date** \_\_\_\_\_

## 2 CHECK HISTORICAL CHARACTERIZATION

Not Potentially Contaminated\_\_\_\_\_ RAD\_\_\_\_\_ Hazardous\_\_\_\_\_ Mixed\_\_\_\_\_

### 3 EQUIPMENT INFORMATION AND BACKGROUND MEASUREMENTS

Manufacturer and Model No	Serial Number	Probe Type	Probe Serial No	Calibration Due Date	Background Reading	Units (cpm)

#### 4 SAMPLE MEASUREMENTS

[illegible]

If any OVD or RAD measurements are above background measurements, forms FO 8B and/or FO 16A must be completed for verification

Completed By: \_\_\_\_\_

Print Name \_\_\_\_\_

**Signature**

Subcontractor \_\_\_\_\_

1 Project Location \_\_\_\_\_ Site Number \_\_\_\_\_ Date \_\_\_\_\_

[illegible]

**Completed By** \_\_\_\_\_

(4011-910-0088-910)(FOI REV. 2)(04/30/92)

## VERIFICATION OF ORGANIC VAPOR MONITORING RESULTS

1 Project Name &amp; Number \_\_\_\_\_

Date \_\_\_\_\_ Site Number: \_\_\_\_\_

2 Historical Characterization (check one).

☐ Not potentially contaminated ☐ Low-Level RAD ☐ Hazardous ☐ Mixed

3 Pework/Background Organic Vapor Monitoring Results

Instrument Used \_\_\_\_\_ Serial No \_\_\_\_\_

(Numeric Value) \_\_\_\_\_ (Units, i e , ppm) \_\_\_\_\_

4 Verification Measurements

Time	Depth (Ft)	Initial Reading (ppm)	First Background Check (ppm)	First Verification Reading (ppm)	Second Background Check (ppm)	Second Verification Reading (ppm)

5 If either of the verification measurements are above the preceding background measurement, the initial measurement has been verified

Completed By \_\_\_\_\_  
Print Name Signature Date

Subcontractor \_\_\_\_\_



## RECORD OF DRILLING FLUIDS AND CUTTINGS (ONE FORM PER DRILLING LOCATION)

**1 Project Name & Number** \_\_\_\_\_

Date of Activities \_\_\_\_\_ / \_\_\_\_\_ Site Number \_\_\_\_\_  
Initiated Completed

2. Contaminant classes assumed to be present (check one)

<u>          </u>	<b>Low-Level RAD Substances</b>	<u>          </u>	<b>Hazardous Substances</b>
<u>          </u>	<b>Mixed Substances</b>	<u>          </u>	<b>Not Potentially Contaminated</b>

### 3 Unanticipated contaminant classes found

           No            Yes (check as appropriate)

\_\_\_\_\_ Low-Level RAD Substances      \_\_\_\_\_ Hazardous Substances      \_\_\_\_\_ Mixed Substances

#### 4 Drum and Environmental Monitoring Information

<b>Organic Vapors</b>	<b>(Instrument Used)</b>
-----------------------	--------------------------

**Radioisotopes.** \_\_\_\_\_ **(Instrument Used)**

[illegible]

**Completed By** \_\_\_\_\_  
**Print Name** **Signature** **Date**

Subcontractor: \_\_\_\_\_

This is a  
**CONTROLLED DOCUMENT**

EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

RECEIVING, LABELING, AND HANDLING ENVIRONMENTAL MATERIALS CONTAINERS  
This is a RED Stamp

EG&G ROCKY FLATS PLANT  
EMD MANUAL OPERATION SOP

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Approved By

  
(Name of Approver)

MAY 12, 1992

(Date)

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### 2.0 PURPOSE AND SCOPE

The environmental materials generated from Environmental Management (EM) field activities will be handled in accordance with the Rocky Flats Plant (RFP) waste management program. This standard operating procedure (SOP) describes procedures that will be used by subcontractors at RFP to receive, mark, and handle environmental drums until they are returned to RFP's representative, EG&G.

These procedures are intended to be sufficiently detailed so that conformance with them will result in reliable drum handling and management.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

Personnel using light or heavy equipment, scientific monitoring devices, or operating company vehicles must have appropriate training and/or licenses.

The subcontractor's site manager is responsible for the proper handling of all materials generated during drilling activities.

The subcontractor is responsible for drumming drill cuttings and other solid materials associated with environmental activities. The transfer of drums to the custody of EG&G Waste Operations personnel shall occur once the drum's contents have been characterized, the drum has been inspected, and space is available at the Waste Operations transfer/storage area.

The subcontractor is also responsible for moving environmental liquids associated with EM drilling activities to holding tanks located at the main EG&G decontamination facility.

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It is the subcontractor's site manager's responsibility to report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. Damaged drums will have their contents transferred to an undamaged drum.

The subcontractor's site manager will assign personnel to conduct weekly inspections of the drums issued to the subcontractor until relinquished to the custody of EG&G. These inspections will ensure that drum integrity is maintained.

Radiological Engineering-approved subcontractor Health and Safety Specialists are responsible for conducting radiation screenings of equipment, samples, and personnel before they leave potentially contaminated work areas.

EG&G's Waste Operations personnel are responsible for the collection, transport, storage, treatment, and disposal of solid and liquid environmental materials from the drum transfer area at the main decontamination facility.

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

Hazardous Waste Requirements Manual (HWRM) EG&G June 1991

On-site Transportation Manual EG&G 1991

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EPA/540/P-87/001 December 1987

Hall, Ridgway M Jr , Tom Watson, Jeffrey J Davidson, David R Case, Nancy S Bryson. RCRA  
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Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health  
Administration (OSHA), U S Coast Guard (USCG), and U S Environmental Protection Agency  
(EPA) October 1985

### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows

- SOP FO 3, General Equipment Decontamination
- SOP FO.5, Handling of Purge and Development Water
- SOP FO 6, Handling of Personal Protective Equipment
- SOP FO 7, Handling of Decontamination Water and Wash Water
- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 9, Handling of Residual Samples
- SOP FO 12, Decontamination Facility Operations
- SOP FO 15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs)
- SOP FO 16, Field Radiological Measurements

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### 5.0 EQUIPMENT

Several types of equipment can be used to move drums too heavy to lift safely. A list of appropriate equipment includes

- A drum grappler attached to a hydraulic excavator
- A small front-end loader, which can be either loaded manually or equipped with a bucket sling
- A rough terrain forklift
- A roller conveyor equipped with solid rollers
- Drum carts designed specifically for drum handling
- Miscellaneous sizes of wrenches, sockets, and socket ratchets for opening and sealing drums
- Wood pallets
- Plastic or nylon banding

The drum grappler is the preferred equipment for handling heavy drums (NIOSH, et al., 1985)

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### 6.0 WORK AREA CHARACTERIZATIONS

Each project work area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area and include the chemical results of previous soil, groundwater, and surface water analyses and the results of field radiological surveys conducted by Radiological Engineering-approved subcontractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSSs)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Areas (PA)

Potentially contaminated work areas where groundwater plumes have been identified will be specified in the applicable Work Plans, as appropriate. Table FO 10-A1 of Appendix FO 10A lists the IHSS work areas at RFP. Figure FO 10-A1, of Appendix A, shows the locations of the RFP IHSSs. Figure FO 10-1 illustrates the identified groundwater plume areas and the americium area at OU No. 2. All other potentially contaminated work areas will be specified in the individual project Work Plans and/or Health and Safety Plans.

Various types of environmental materials are generated during EM field operations. Solid environmental materials for the purpose of EM waste management at the RFP include drill cuttings, sludge, surface soils, and disposable personal protective equipment (PPE). Environmental liquids generated during field activities include drilling fluids, decontamination and wash water, and residual groundwater and surface water samples.



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The types of contamination that may be encountered within potentially contaminated work areas include the following

- Low-level radioactively contaminated substances
- Nonradioactive RCRA-regulated hazardous (hazardous) substances
- Mixed (low-level radioactive and hazardous substances)

The use of field monitors for the detection of volatile organics and radionuclides is discussed in SOPs FO 8, Handling of Drilling Fluids and Cuttings, FO 15, Photoionization Detectors (PIDs) and Flame Ionization Detectors (FIDs), and FO 16, Field Radiological Measurements

Environmental materials generated within work areas characterized as not potentially contaminated and where no verified positive readings were detected on field monitors will be considered uncontaminated and handled as described in the following SOPs

- SOP FO 5, Handling of Purge and Development Water
- SOP FO 6, Handling of Personal Protective Equipment
- SOP FO 7, Handling of Decontamination Water and Wash Water
- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 9, Handling of Residual Samples

### 7.0 DRUM RECEIVING, LABELING, AND HANDLING PROCEDURES

#### 7.1 RECEIVING

Environmental drums can be obtained by contacting the EG&G project manager. The amount of drums required to perform the work will be specified by the subcontractor. The type of drums required to perform the work will be specified by EG&G Waste Operations. The EG&G project

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manager will direct the subcontractor to the appropriate drum distribution area. An advance notice of five days is preferred.

### 7.1.1 Drum Color Codes

EG&G has segregated drums into a color coding scheme for identification to ensure the proper management of waste (RFPM MAT 20-005). The color code identifies the suspected contaminant characterization of the materials within the drums. The color scheme has been modified to specifically address EM operations. EM drums are gray and contain only environmental materials pending analysis and characterization. The types of EM drums are as follows:

- Gray Drums 1 Gray, 55-gallon or 30-gallon 17C, open top (removable top) drums will be used for the temporary containment of uncharacterized drill cuttings. These environmental materials are awaiting the results of chemical analyses for contaminant characterization.
- 2 Gray, 55-gallon or 30-gallon, closed top drums will be used for moving environmental liquids to the main EG&G decontamination facility and emptied.

Other closable transfer containers, appropriately sized for the volume of water generated by the tasked activity, may also be used for moving environmental liquids associated with drilling activities to the holding tanks at the central decontamination facility.

Uncontaminated disposable PPE and uncontaminated miscellaneous solid environmental materials will be placed in double bagged 3 mil clear plastic bags at the work area. When full, these plastic bags will be labeled and transferred to EG&G's custody at a designated transfer area along with the appropriate COC forms.

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### 7.2 MARKING

EG&G will assign a sequential number for each gray drum received. A two-letter subcontractor ID will follow directly behind the drum ID number. The letter ID will be assigned by EG&G. For example, "1326WC" would identify Drum Number 1326 handled by Woodward-Clyde. Additionally, an identifying marking will be associated with each drum. A Drum Field Log Form (Form FO 10A, see Section 7.0, Documentation) will be used by the subcontractor to track each drum used for containing solid environmental materials until returned to EG&G.

#### 7.2.1 Environmental Liquids

Environmental liquids generated within work areas where drilling activities are being conducted will be characterized as potentially contaminated. These environmental liquids will be placed in gray drums or appropriately sized liquid transfer containers and moved by the subcontractor's personnel. Field personnel should decant the environmental liquids from one drum (or container) to another (or from a trough to a drum or transfer container) if the amount of sludge and sediment within the environmental liquids is substantial. The residual sediment will be contained in gray drums as described in Subsection 6.3.2. The environmental liquids will then be brought to the central EG&G decontamination facility. The decontamination facility will have an area specifically designed to receive environmental liquids. The environmental liquids area will include a decanting process to remove residual sludges and sediments remaining within the liquid. The subcontractor will empty the entire drum's contents into this area. The environmental liquids will be pumped from the decanting area to holding tanks. When a liquid holding tank is full, an EG&G designated subcontractor will take a representative sample from the tank for volatile organic analysis (see SOP FO 12, Decontamination Facility Operations). Environmental liquids must be transported to the 374 evaporator or the granulated activated carbon (GAC) unit within 90 days.

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The following marking and handling procedures apply to any containers used for moving environmental liquids

- In addition to the ID number, the drums or liquid containers will be marked with the words "NONPOTABLE PENDING ANALYSIS "
- A paint stick should be used to apply identifying marks on liquid transfer containers to ensure that the markings will not be washed away during decontamination or precipitation. Paint should not be applied in the vicinity of sampling or field monitoring events to prevent cross-contamination of samples.
- Identifying marks should be legible, approximately 2 inches high, and written on two (opposite) sides and on the top of the container
- Containers will be placed on a level surface
- A Radiological Engineering-approved subcontractor Environmental Health and Safety Specialist will do a radiation screening test on the exterior of the container before the container leaves potentially radiologically contaminated work areas. If necessary, the exterior of the container will be decontaminated
- Environmental liquids container lids will be secured before the containers are moved. Containers will be moved in trucks with enclosed sides and will not be stacked
- After the container's contents have been emptied, the subcontractor's personnel will decontaminate the container prior to any additional use (see SOP FO.3, General Equipment Decontamination)

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- Empty gray drums may be stored by the subcontractor at a designated location in the work area. Drums will be banded to prevent them from blowing away.
- The subcontractor will designate personnel to inspect the integrity of the drums and labeling on a weekly basis. Faded or damaged labeling must be relabeled. Drums will be inspected for damage according to the Hazardous Waste Requirements Manual (HWRM). Types of damage include holes, damage to the lid seal, or any other problem that may compromise drum integrity. The subcontractor will report as soon as possible to the EG&G project manager or a designated EG&G representative any damage incurred to a drum. Damaged drums must have their contents transferred to an undamaged drum. The results of this inspection will be documented on a Drum Inspection Form (Form FO 10B, see Section 70-Documentation), dated, and signed by the person performing the inspection.
- Any containers used off site, such as decontamination and wash water containers, must meet DOT specifications for containers, markings, and labeling (see Subsection 6.3.2).

For surface water field activities, wash water and rinse water used in background areas (as designated in the project-specific Work Plans) will be disposed of on the ground at least 50 feet from the sampling location such that the waste water cannot discharge into any stream, pond, or other surface water impoundment.

Wash water used to clean equipment, personnel, or vehicles during surface soil sampling or groundwater sampling in work areas characterized as not potentially contaminated where no verified positive readings were detected on field monitors will be disposed of approximately 50 feet from the sampling location. The disposal location must be at least 200 feet from any stream drainage.

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### 7.2.2 Temporary Containment of Solid Environmental Materials Pending Characterization

Gray drums will be used for the temporary containment of solid environmental materials that are pending characterization including drill cuttings. For 55-gallon drums that will contain drill cuttings, a black rigid liner and round bottomed bag will be placed in the drum and two liters of desiccant will be placed in the bottom of the drum. Two additional liters will be put into the drum when the drum has been half filled. Cuttings will be placed in the drum until the drum is full to approximately 2 inches from the top of the liner. After filling, gray drums will be sealed with a bolt approximately 90° from the drum seam, cleaned if muddy, marked, and placed on pallets. Representative environmental samples from an associated well, boring, or sampling location will be sent to an off site laboratory for a full suite of analytical results to characterize these environmental materials. The drums will remain at the drilling site until a Waste Operations storage area is available. At the time Waste Operations notifies EM that space is available, the drums will be moved to the transfer/storage area to await assessment of the associated environmental samples.

The subcontractor will perform the following steps to ensure the proper handling of the gray drums until transferred to EG&G custody:

- Drums will be checked out from the EG&G drum storage yard with the drum number, subcontractor ID, date and project ID recorded in the drum checkout log.
- In addition to the drum number, the drums will be marked with the words "ENVIRONMENTAL MATERIAL PENDING ASSESSMENT", the associated well, boring, or sampling number and location, the word "SOIL", the subsurface interval (if soil), and the date the drum was filled. (Soils will not be commingled with miscellaneous environmental materials within a drum.) No PPE is to be drummed.

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- A paint stick will be used to apply identifying marks on drums to ensure that the marks will not be washed away during decontamination or precipitation. A paint stick should not be applied in the vicinity of sampling or field monitoring events to prevent cross-contamination of samples.
- Identifying marks should be legible, with characters approximately 2 inches high, and written on two (opposite) sides and on the top of the drum.
- Gray drums will be placed on leveled wood pallets containing a maximum of 3 drums at the drilling site.
- The appropriate information will be documented on the Drum Field Log Form (Form FO 10A).
- Gray drums will be transferred to EG&G's custody at a designated transfer/storage area only after Waste Operations notifies EM personnel that storage is available. The drums should be placed on wood pallets and bound with 1 1/4 inch steel bands at the transfer/storage area.
- A Radiological Engineering-approved subcontractor Health and Safety Specialist will do a radiation screening test on the exterior of the drum before the drum leaves a potentially radiologically contaminated work area. If necessary, the exterior of the drum will be decontaminated.
- Drum lids will be secured with the bolt ring approximately 90° from the seam. Drums will be moved in trucks with enclosed sides.

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- A copy of the completed Drum Field Log Form (Form FO 10A) will be given to the receiving EG&G Waste Operations personnel (see Section 7.0, Documentation)
- Drums will be decontaminated and repainted prior to any reuse
- A new drum number will be applied to the repainted drum

When the validated chemical analyses from the environmental samples are received by EG&G, Waste Operations will be sent a summary of the results from the EG&G project manager. If the drum's contents are determined to be uncontaminated, the contents will be disposed of in the landfill.

If the drums are determined to contain hazardous substances, mixed substances, or radioactive substances, the gray drums will be painted the appropriate color corresponding to the characterization of the drum's contents and labeled appropriately (See Section 7.3, Labeling, below) by EG&G Waste Operations.

Field monitoring including OVDs and radiation detectors will be used during intrusive activities regardless of the work area characterization. SOP FO 8, Handling of Drilling Fluids and Cuttings describes the use of field monitors for intrusive activities as well as verifying positive readings.

### 7.3 LABELING

Gray drums containing solid environmental materials that have been characterized as radioactive or mixed will be painted white. If the drum's contents have been characterized as radioactive but not hazardous, the drum will be labeled with a "White I" radioactive label. If the drum's contents have been characterized as mixed, the drum will be labeled with an ORM-E label per HWRM and the On-site Transportation Manual requirements.



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Gray drums containing solid environmental materials that have been characterized as hazardous only will be painted white on the ends and black in the center. These drums will be labeled with an ORM-E sticker per HWRM and the On-site Transportation Manual requirements

### 8.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data. Observations and data will be recorded on drum field log forms. Subcontracting personnel may also choose to document the observations and data in a personal field notebook in addition to the field log forms. If a field book is used, entries should be made with a black waterproof ink pen. The field notebook should be waterproofed and have consecutively numbered pages.

It is recommended that the subcontractor bring duplicate copies of the completed Drum Field Log Form when transferring custody of waste drums to EG&G personnel. Both copies should be signed by the receiving EG&G representative. EG&G Waste Operations will retain one signed copy and the subcontractor will retain the second signed copy in the project files.

Drum forms will be kept in EG&G files in addition to the subcontractor's project files until the project is completed. All project files will be turned over to EG&G at this time (see SOP FO 2, Field Documentation)

### 8.1 DRUM FIELD LOG FORMS

A Drum Field Log Form will be kept on each drum by the EG&G representative and the subcontractor from the time of issuance until returned to an EG&G representative. An EG&G copy of the drum form will be turned in to the EG&G representative within a week after the drum has been filled. At a minimum, the forms will include the following:

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- The name of the subcontractor issued the drum
- The color of the drum
- The identification number with the subcontractor's ID
- The date the drum was issued
- The location of the field activity area
- The contents of the drum (include the subsurface interval if contents are soils from a well or boring)
- The date the drum was filled
- The date the drum was decontaminated or returned to EG&G (include the EG&G facility where the drum was returned to)

Form FO 10A is an example of the Drum Field Log Form to be used. Drum log forms must be checked and updated immediately upon handling. In addition to the drum marking, the Drum Field Log Form will identify the drum and provide a history of the drum. All the field log forms combined will be used to track the movement of environmental materials generated during EM field operations.

### 8.2 DRUM INSPECTION FORM

The subcontractor is responsible for conducting weekly inspections of all the gray drums they have been issued until the drum is returned to EG&G. Weekly inspections will ensure that the integrity and

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labeling of the drums is maintained The Drum Inspection Form (Form FO 10B) will be used to document these inspections

### 8.3 CONTAMINANT CHARACTERIZATION FORM

The Contaminant Characterization Form (Form FO 10C) will be used to document/record the characterization of materials that have been temporarily stored in gray drums until analytical results are received Upon receipt of all the sample methods for each sample associated with the drum, the subcontractor will submit the drum identification portion of the form along with the analytical results to the EG&G project manager The drum contents will be characterized by an EG&G representative based on the chemical and radiological analyses and returned to EG&G's Waste Operations personnel An undated signed copy of the waste characterization form will be turned in with the drum form to the EG&G representative within one week of the drum being filled

### 8.4 COMPUTER LOG FORMS

All information found on drum field log forms may be entered into a computer database by designated subcontractor personnel This will allow the immediate tracking of any environmental drum used by a subcontractor during EM field activities and will provide a backup to the field log forms

**DRUM FIELD LOG FORM**

NAME OF THE SUBCONTRACTOR \_\_\_\_\_

DRUM ID NUMBER WITH SUB ID \_\_\_\_\_

DRUM ISSUE DATE \_\_\_\_\_

LOCATION OF ISSUANCE \_\_\_\_\_

PROJECT NAME &amp; NUMBER \_\_\_\_\_

LOCATION OF FIELD ACTIVITY \_\_\_\_\_

ASSOCIATED WELL, BORING, OR \_\_\_\_\_

CONTENTS OF DRUM \_\_\_\_\_

SUBSURFACE INTERVALS (IF SOILS)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ASSOCIATED SAMPLE ID NUMBERS

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DATE DRUM WAS FILLED \_\_\_\_\_

SIG OF PERSON FILLING THE DRUM \_\_\_\_\_

**IF SOLID ENVIRONMENTAL MATERIALS**

LOCATION OF TEMP STORAGE AREA \_\_\_\_\_

DATE DRUM RETURNED TO EG&amp;G \_\_\_\_\_

SIG OF EG&amp;G REPRESENTATIVE \_\_\_\_\_

**IF ENVIRONMENTAL LIQUIDS**DATE & LOCATION WHERE CONTENTS  
WERE EMPTIED AND DECONNED

(e g 2/18/91 DECON PAD # \_\_\_\_)

DATE

LOCATION

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# DRUM INSPECTION FORM

[illegible]

**CONTAMINANT CHARACTERIZATION FORM  
FOR GRAY DRUMS PENDING CHARACTERIZATION****ATTACH CHEMICAL RESULTS OF ASSOCIATED SAMPLES****THIS PORTION WILL BE COMPLETED BY THE SUBCONTRACTOR**

Name of the Subcontractor Issued the Drum \_\_\_\_\_

The Serialized Drum ID Number with the Subcontractor's ID \_\_\_\_\_

The Drum Issue Date \_\_\_\_\_

The Location of the Field Activity Area \_\_\_\_\_

The Associated Well, Boring, or Sampling Location \_\_\_\_\_

The Contents of the Drum \_\_\_\_\_

Subsurface Intervals (Ft), if Soils or Bag Numbers, if PPE \_\_\_\_\_

The Date the Drum was Filled \_\_\_\_\_

Matrix of Samples Analyzed \_\_\_\_\_

**ASSOCIATED SAMPLES**

Sample No.	Depth (ft)	Sample No.	Depth (ft)	Sample No.	Depth (ft)

Date Submitted to EG&amp;G for Characterization \_\_\_\_\_

Subcontractor's Representative Signature \_\_\_\_\_

**THIS PORTION WILL BE COMPLETED BY EG&G**

The Contaminant Characterization of the Drum's Contents \_\_\_\_\_

Signature of EG&amp;G Representative Determining the \_\_\_\_\_

Contaminant Characterization and Date Signed \_\_\_\_\_

Date \_\_\_\_\_

EG&amp;G Holding Facility Where Drum Will be Stored \_\_\_\_\_

Date and Time Form Returned to Waste Operations \_\_\_\_\_

Date \_\_\_\_\_ Time \_\_\_\_\_

**APPENDIX FO.10A**

APPENDIX FO.10A

TABLE FO 10-A1  
ROCKY FLATS PLANT  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF. NO.</u>	<u>SITE NAME</u>
101	207 SOLAR EVAPORATION PONDS
102	OIL SLUDGE PIT
103	CHEMICAL BURIAL
104	LIQUID DUMPING
105	OUT-OF-SERVICE FUEL TANKS
	105 1 - WESTERNMOST TANK
	105 2 - EASTERNMOST TANK
106	OUTFALL
107	HILLSIDE OIL LEAK
108	TRENCH T-1
109	TRENCH T-2
110	TRENCH T-3
	TRENCHES T-4 TO T-11
	111 1 TRENCH T-4
	111 2 TRENCH T-5
	111 3 TRENCH T-6
	111 4 TRENCH T-7
	111 5 TRENCH T-8
	111 6 TRENCH T-9
	111 7 TRENCH T-10
	111 8 TRENCH T-11
112	903 DRUM STORAGE AREA
113	MOUND AREA
114	PRESENT LANDFILL
115	ORIGINAL LANDFILL
116	MULTIPLE SOLVENT SPILLS
	116 1 WEST LOADING DOCK AREA
	116 2 SOUTH LOADING DOCK AREA

Note This information is based on the administrative record including the information submitted in the hazardous and low-level mixed waste Part B application dated November 1, 1985, as modified by the subsequent revision dated November 28, 1986, as modified by the subsequent revision dated December 15, 1987, and the transuranic mixed waste Part B application submitted July 1, 1988, Thereafter referred to as the applications This information is also based on independent review of historical aerial photographs of the facility and independent review of facility submittals



## TABLE FO 10-A1 (cont )

## INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF. NO.</u>	<u>SITE NAME</u>
117	CHEMICAL STORAGE 117 1 NORTH SITE 117 2 MIDDLE SITE 117.3 SOUTH SITE
118	MULTIPLE SOLVENT SPILLS 118 1 WEST OF BUILDING 731 118 2 SOUTH END OF BUILDING 776
119	MULTIPLE SOLVENT SPILLS 119 1 WEST AREA 119 2 EAST AREA
120	FIBERGLASSING AREAS 120 1 NORTH OF BUILDING 664 120 2 WEST OF BUILDING 664
121	ORIGINAL PROCESS WASTE LINES
122	UNDERGROUND CONCRETE TANK
123	VALVE VAULT 7 123 1 VALVE VAULT 7 4,000 GALLON TANK #67
125	HOLDING TANK
126	OUT-OF-SERVICE PROCESS WASTE TANKS 126 1 WESTERNMOST TANK 126 2 EASTERNMOST TANK
127	LOW-LEVEL RADIOACTIVE WASTE LEAK
128	OIL BURN PIT NO 1
129	OIL LEAK
130	RADIOACTIVE SITE - 800 AREA SITE #1
131	RADIOACTIVE SITE - 700 AREA SITE #1
132	RADIOACTIVE SITE - 700 AREA SITE #4
133	ASH PITS 133 1 ASH PIT 1-1 133 2.ASH PIT 1-2 133 3.ASH PIT 1-3 133 4 ASH PIT 1-4 133 5 INCINERATOR 133 6 CONCRETE WASH PAD
134	LITHIUM METAL DESTRUCTION SITE
135	COOLING TOWER BLOWDOWN

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF. NO.</u>	<u>SITE NAME</u>
136	COOLING TOWER PONDS 136 1 NORTHEAST CORNER OF BUILDING 460 136 2 WEST OF BUILDING 460 136.3 S OF BLDG 460, W OF BLDG 444
137	COOLING TOWER BLOWDOWN - BLDG 774
138	COOLING TOWER BLOWDOWN - BLDG 779
139	CAUSTIC/ACID SPILLS 139 1 HYDROXIDE TANK AREA 139 2 HYDROFLUORIC ACID TANKS
140	REACTIVE METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES) 142 1 A-1 POND METAL DESTRUCTION SITE
141	SLUDGE DISPERSAL
142	RETENTION PONDS (A,B,C-SERIES) 142 1 A-1 POND 142 2 A-2 POND 142 3 A-3 POND 142 4 A-4 POND 142 5 B-1 POND 142 6 B-2 POND 142 7 B-3 POND 142 8 B-4 POND 142 9 B-5 POND 142 10 C-1 POND 142 11 C-2 POND 142 12 NEWLY IDENTIFIED A-5 POND
143	OLD OUTFALL
144	SEWER LINE BREAK
145	SANITARY WASTE LINE LEAK
146	CONCRETE PROCESS WASTE TANKS 146 1 7,500 GALLON TANK (#31) 146 2 7,500 GALLON TANK (#432) 146.3 7,500 GALLON TANK (#34W) 146 4 7,500 GALLON TANK (#34E) 146 5 3,750 GALLON TANK (#30) 146 6 3,750 GALLON TANK (#33)
147	PROCESS WASTE LEAKS 147 1 MAAS AREA 147 2 OWEN AREA
148	WASTE SPILLS
149	EFFLUENT PIPE

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF. NO</u>	<u>SITE NAME</u>
150	RADIOACTIVE LIQUID LEAKS (8) 150 1 NORTH OF BUILDING 771 150 2 WEST OF BUILDING 771 150 3 BETWEEN BUILDINGS 771 and 774 150 4 EAST OF BUILDING 750 150 5 WEST OF BUILDING 707 150 6 SOUTH OF BUILDING 779 150 7 SOUTH OF BUILDING 776 150 8 NORTHEAST OF BUILDING 770
151	FUEL OIL LEAK
152	FUEL OIL TANK
153	OIL BURN PIT NO 2
154	PALLET BURN SITE
155	903 LIP AREA
156	RADIOACTIVE SOIL BURIAL 156 1 BUILDING 334 PARKING LOT 156 2 SOIL DUMP AREA
157	RADIOACTIVE SITE 157 1 NORTH AREA 157 2 SOUTH AREA
158	RADIOACTIVE SITE - BLDG 551
159	RADIOACTIVE SITE - BLDG 559
160	RADIOACTIVE SITE - BLDG 444 PK LOT
161	RADIOACTIVE SITE - BLDG. 664
162	RADIOACTIVE SITE - 700 AREA SITE #2
163	RADIOACTIVE SITE - 700 AREA SITE #3 163 1 WASH AREA 163 2 BURIED SLAB
164	RADIOACTIVE SITE - 800 AREA SITE #2 164 1 CONCRETE SLAB 164 2 BUILDING 886 SPILLS 164 3 BUILDING 889 STORAGE PAD
165	TRIANGLE AREA
166	TRENCHES 166 1 TRENCH A 166 2 TRENCH B 166 3 TRENCH C
167	SPRAY FIELDS - THREE SITES 167 1 NORTH AREA 167 2 POND AREA 167 3 SOUTH AREA
168	WEST SPRAY FIELD

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO.</u>	<u>SITE NAME</u>
169	WASTE DRUM PEROXIDE BURIAL
170	P U & D STORAGE YARD - WASTE SPILLS
171	SOLVENT BURNING GROUND
172	CENTRAL AVENUE WASTE SPILL
173	RADIOACTIVE SITE - 900 AREA
174	P U & D CONTAINER STORAGE FACILITIES (2)
175	S&W BLDG 980 CONTAINER STORAGE FACILITY
176	S&W CONTRACTOR STORAGE YARD
177	BUILDING 885 DRUM STORAGE AREA
178	BUILDING 881 DRUM STORAGE AREA
179	BUILDING 865 DRUM STORAGE AREA
180	BUILDING 883 DRUM STORAGE AREA
181	BUILDING 334 CARGO CONTAINER AREA
182	BUILDING 444/453 DRUM STORAGE AREA
183	GAS DETOXIFICATION AREA
184	BUILDING 991 STEAM CLEANING AREA
185	SOLVENT SPILL
186	VALVE VAULT 12
187	ACID LEAKS (2)
188	ACID LEAK
189	MULTIPLE ACID SPILLS
190	CAUSTIC LEAK
191	HYDROGEN PEROXIDE SPILL
192	ANTIFREEZE DISCHARGE
193	STEAM CONDENSATE LEAK
194	STEAM CONDENSATE LEAK
195	NICKEL CARBONYL DISPOSAL
196	WATER TREATMENT PLANT BACKWASH POND
197	SCRAP METAL SITES
198	VOCs IN GROUND WATER
199	CONTAMINATION OF THE LAND SURFACE
200	GREAT WESTERN RESERVOIR
201	STANDLEY RESERVOIR
202	MOWER RESERVOIR
203	INACTIVE HAZARDOUS WASTE STORAGE AREA
204	ORIGINAL URANIUM CHIP ROASTER
205	BLDG 460 SUMP 43 ACID SIDE
206	INACTIVE D-836 HAZARDOUS WASTE TANK
207	INACTIVE 444 ACID DUMPSTER
208	INACTIVE 444/447 WASTE STORAGE AREA
209	SURFACE DISTURBANCE SOUTHEAST OF BLDG 881
210	UNIT 16, BUILDING 980 CARGO CONTAINER

TABLE FO 10-A1 (cont )  
INDIVIDUAL HAZARDOUS SUBSTANCE SITES

<u>REF NO.</u>	<u>SITE NAME</u>
211	UNIT 26, BUILDING 881 DRUM STORAGE
212	UNIT 63, BUILDING 371 DRUM STORAGE
213	UNIT 15, 904 PAD PONDCRETE STORAGE
214	UNIT 25, 750 PAD PONDCRETE AND SALTCRETE STORAGE
215	UNITS 55 13, 55 14, 55 15, 55 16 - TANKS T-40, T-66, T-67, T-68
216	EAST SPRAY FIELDS 216 1 NORTH AREA 216 2 CENTER AREA 216 3 SOUTH AREA
217	UNIT 32, BUILDING 881, CN- BENCH SCALE TREATMENT

Control copies shall use  
existing map

**FIELD COMMUNICATIONS**

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<b>Category 2</b>	<b>Organization:</b>	<b>Environmental Management</b>

**TITLE**  
**FIELD COMMUNICATIONS**

Approved By: 

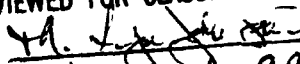
**MAY 12 1992**

(Name of Approver)

(Date)

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REVIEWED FOR CLASSIFICATION/UCM

By   
 Date March 9, 1992

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) provides procedures that will be used at The Rocky Flats Plant (RFP) to establish subcontractor internal and external communication links, and basic emergency communication needs

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

A short training session on use of telephones and radios will be conducted by the subcontractor's Site Manager. Concomitantly, a discussion of communication etiquette and emergency signals will be included in the training. The Site Manager should document the names of all personnel attending these training sessions in the daily log book. The Site Manager will post the names and phone numbers of key personnel to be contacted in case of emergency.

In case of an emergency, the Emergency Coordinator (EC) for the RFP is the Shift Supervisor on duty. The EC will respond to all emergencies and coordinate emergency response activities. The EC will activate the Emergency Operation Center (EOC), notify departments that have an advisory role in the situation, and contact off-site agencies (police, medical, etc.) if required.

### 4.0 REFERENCES

#### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987



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EG&G Rocky Flats Plant Environmental Restoration Health and Safety Program Plan, October 1990

### 5.0 COMMUNICATION PROCEDURES

#### 5.1 COMMUNICATIONS INTERNAL TO SUBCONTRACTOR'S OPERATION

##### 5.1.1 Radios and Telephones

A communication center will be established at the subcontractor's field trailer office. This office will be equipped with a telephone communications system for routine operations. Field radios and chargers are assigned and issued to subcontractors by EG&G's Environmental Management (EM), RFP. Radios are assigned as follows:

- 1 radio per field team
- 1 radio for the field trailer
- 1 radio for the site supervisor
- 1 radio for the site Health and Safety Officer
- 1 to 2 radio(s) as spares if available from communication officer

All subcontractor radios shall be operated on channels designated by the communication officer.

Field teams will utilize the two-way radio system for contact with both the field office trailer and other field teams. The radio system will be part of the RFP network so that field crews have a direct link to emergency response groups if an emergency occurs. In the event of an emergency, procedures outlined in the Site Health and Safety Plan shall be followed. If a temporary shortage of radios occurs, subcontractors can arrange to use each other's field trailer radio for communications with their respective field crews. Since multiple subcontractors share the same radio network and channel, it is important for field crews to exercise prudent use of field radios. Any field crew declaring an emergency shall have

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priority on radio usage. All other personnel not involved in the emergency or emergency response shall refrain from radio usage until the emergency is resolved. Additionally, proper demeanor will be maintained on the radio network at all times. This means that no profanity or coarse language will be used in transmitting messages.

Radio transmissions will not use codes to deliver messages. Radios requiring repair will be exchanged with EG&G EM.

### 5.1.2 Alarms

All personnel working on the RFP will be trained to immediately recognize RFP and Emergency Response site alarm signals.

Standard alarm signals must be documented in each Site Plan. Subcontractors can call 966-7541 to listen to a recording of RFP alarm signals and the significance of each.

In addition to the standard RFP and Emergency Response site alarm signals, field crews involved in drilling or other loud-noise activities will utilize a compressed air horn to communicate the alarm messages identified below:

- One long blast -- evacuate area in a cross-wind direction
- Two short blasts -- localized problem (not dangerous to workers)
- Two long blasts -- all clear

Field crews will use hand signals to indicate an understanding of the alarm message as appropriate.

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### 5.1.3 Buddy System

Most field activities will be conducted in pairs or groups of personnel. This system, known as the buddy system, ensures that all personnel receive assistance if required. Additionally, the buddy system minimizes the health and safety risks associated with any hazardous area.

The buddy system alone may not be sufficient to ensure that help will be provided in an emergency. Therefore, workers in the activity area should be in line-of-sight contact or communications contact with backup personnel in the work area.

### 5.1.4 Hand Signals

The following standard hand signals shall be used in the event of failure of radio communications or if wearing personal protective equipment impedes hearing:

- Hand gripping throat -- out of air, cannot breathe
- Grip partner's wrist or both hands around partner's waist -- leave area immediately
- Hands on top of head -- need assistance
- Thumbs up -- ok, I am all right, I understand
- Thumbs down -- no, negative

## 5.2 EXTERNAL COMMUNICATION

The specifics for each field activity will be delineated in the Health and Safety Plan accompanying that activity. In general, the following is applicable to all situations.

The closest accessible telephone during all working hours will be identified by the Site Safety Officer (SSO) prior to commencing field activities if communication with the field trailer office communications

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center is not possible All guard posts have telephones Emergency telephone numbers will be posted near the field office telephone as follows

### Rocky Flats Plant Medical Facility (Building 122, Central Avenue)

Ambulance Service 966-2911  
General Information 966-2594

Rocky Flats Fire  
Emergency 966-2911  
Routine 966-4336

Rocky Flats Police/Security  
Emergency 966-2911  
Routine 966-2444

Spill Response  
Emergency 966-2911  
Non-Emergency 966-2914

When reporting an emergency provide as much detail as possible, such as

- Your name
- Your location
- Exact location of the emergency
- Nature of emergency
- Condition of patient if applicable

## FIELD COMMUNICATIONS

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- Special hazards in the area
- Any other information requested

In addition, the names and phone numbers of key personnel at Emergency Response remedial project sites with the authority and training to respond to accidents and emergencies must be provided in the subcontractor's Site Plan and posted on site so that they are readily accessible to site workers. Key site personnel to be contacted in the event of an emergency are as follows:

- 1 EG&G Shift Supervisor
- 2 EG&G Environment Restoration Project Manager
- 3 EG&G Site Health & Safety Coordinator
- 4 Subcontractor Field Manager
- 5 Subcontractor Health & Safety Officer

The EG&G Shift Supervisor, with assistance from the EG&G Site Safety Officer, has responsibility and authority for coordinating all emergency response activities until proper authorities arrive and assume control.

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### DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting pertinent field observations and data. Observations of violations that could affect worker health and safety will be recorded by field personnel with black waterproof ink in a bound weatherproof field notebook with consecutively numbered pages. Any observations that need to be permanently documented will be entered into the site manager's daily activity notebook. Entries must be signed and dated by personnel making the entries.

This is a  
**CONTROLLED DOCUMENT**

EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

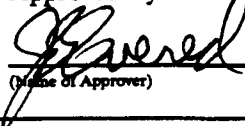
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**DECONTAMINATION FACILITY OPERATIONS**

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TITLE  
DECONTAMINATION FACILITY  
OPERATIONS

Approved By



  
(Name of Approver)

MAY 12 1992

(Date)

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Date  11, 1992

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at the Rocky Flats Plant (RFP) Main Decontamination Facility (MDF). MDF as used in the context of environmental materials management at RFP refers to a fixed facility that will generally include a paved and bermed area equipped with sumps, pumps, and pressurized sprays intended for use in decontaminating large items that could not conveniently be decontaminated in a relatively uncontrolled environment. The terminology MDF should not be interpreted to refer to any specific RFP decontamination facility.

This SOP is applicable to all decontamination operations conducted as part of the Environmental Management (EM) Program and is specifically applicable to heavy equipment and environmental materials containers (drums) used in a work area characterized by EG&G as potentially contaminated (See SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers). This SOP is also specifically applicable to heavy equipment and environmental materials containers used in a work area characterized as not potentially contaminated but where field monitoring conducted during intrusive activities indicates the possible presence of contamination. This SOP does not apply to heavy equipment and environmental materials containers used in a work area characterized by EG&G as not potentially contaminated if field monitoring conducted during intrusive activities does not indicate the presence of contamination. However, a subcontractor may choose to follow the procedures established by this SOP as general practice.



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### **3.0 RESPONSIBILITIES AND QUALIFICATIONS**

The EG&G project manager has the overall responsibility for implementing this SOP and will construct MDFs as needed, provide certain equipment, as listed in Subsection 5.1, Equipment To Be Provided at the MDF, and designate a subcontractor to be responsible for the day-to-day operation of the MDF. For the purposes of this SOP, the designated subcontractor is referred to as the DSC.

The subcontractor designated to maintain the MDF is responsible for providing general use equipment, coordinating with MDF users to ensure efficient utilization of the MDF, performing routine maintenance, operations, and minor repairs to equipment and facilities, managing environmental liquids and residual sediments that are brought to the MDF, and maintaining documentation.

Individual subcontracting companies using the MDF are responsible for coordinating with the DSC, providing the items specified in Subsection 5.2 and as described in Subsection 6.3, conducting the decontamination of their own equipment, and verifying the decontamination effectiveness. Additional equipment-specific decontamination guidance is available within SOP FO 4, Heavy Equipment Decontamination, SOP FO 5, Handling of Purge and Development Water, SOP FO 7, Handling of Decontamination Water and Wash Water, SOP FO 8, Handling of Drilling Fluids and Cuttings, and SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers.

All subcontractor's project managers will be responsible for assigning project staff to implement this SOP and for ensuring the heavy equipment and environmental materials containers used by the subcontractor are decontaminated according to the procedures outlined in this SOP.

All personnel performing these procedures are required to have the appropriate health and safety training as specified in 29 CFR 1910.120. In addition, all personnel are required to have a complete

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understanding of the procedures described within this SOP and receive specific training regarding these procedures, if necessary. Personnel using light or heavy equipment, scientific monitoring devices, or operating vehicles must have appropriate training or licenses.

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure.

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987

Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities  
NIOSH/OSHA/USCG/EPA October 1985

Nuclear Weapon Accident Response Procedures (NARP) Manual The Defense Nuclear Agency  
January 1984 Change 1, July 1984

Radiological Operating Instruction 3.1. Performance of Surface Contamination Surveys EG&G

Standard Operating Safety Guides EPA November 1984

##### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced in this SOP are as follows:

- SOP FO 3, General Equipment Decontamination
- SOP FO 4, Heavy Equipment Decontamination

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- SOP FO 6, Handling of Personal Protective Equipment
- SOP FO 7, Handling of Decontamination Water and Wash Water
- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers
- SOP FO 13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples
- SOP FO 16, Field Radiological Measurements
- SOP SW 6, Sediment Sampling

### 5.0 EQUIPMENT REQUIRED

Various equipment items, supplies, and structures must be provided for the MDF to function as intended. In an attempt to simplify this subject, the equipment listing has been divided into these subsections: Subsection 5.1, Equipment and Supplies to be Provided at the MDF, Subsection 5.2, Equipment and Supplies to be Provided by MDF Users, and Subsection 5.3, MDF Configuration.

#### 5.1 EQUIPMENT AND SUPPLIES TO BE PROVIDED AT THE MDF

The following is a list of equipment that will be provided at the MDF for general use. The party responsible (EG&G or the DSC) for providing each item is indicated in parentheses.

- Drains and tanks for the collection and holding of decontamination and rinse solutions (EG&G)
- One or more moveable tanks for containing RFP tap water for use during decontamination (DSC)

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- Pumps for moving liquids from one container to another container (DSC)
- High pressure steam cleaner and high pressure wash and rinse systems (DSC)
- Portable power generator (DSC)
- Splash curtains (EG&G)
- Wooden pallets (EG&G)
- A rough terrain forklift or equivalent heavy equipment item outfitted with a "drum grapppler" (DSC)
- A drum rack designed to hold empty 55-gallon drums or 30-gallon in a manner that promotes an outward flow of decontamination fluids from the drum interior as it is being decontaminated (EG&G)
- Flammable storage facility/cabinet (EG&G)
- A "dumpster" for containerizing uncontaminated environmental materials (EG&G)
- A two wheeled "dolly" designed to carry 55-gallon drums (DSC)
- Plastic sheeting (DSC)
- Long and short-handled stiff bristle brushes (DSC)
- Wire brushes (DSC)

## DECONTAMINATION FACILITY OPERATIONS

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- Wash and rinse buckets for equipment interiors (DSC)
- Premoistened towelettes (DSC) and Kimwipes
- Duct tape or equivalent (DSC)
- Windsock or equivalent method for decontamination workers to determine the wind direction (DSC)
- A bottom filling bailer or equivalent to collect water samples (DSC)
- Gray, removable-top 55-gallon or 30-gallon drums (EG&G)

### 5.2 EQUIPMENT AND SUPPLIES TO BE PROVIDED BY MDF USERS

Each subcontractor that uses the MDF will provide the following equipment and supplies as needed to complete their decontamination activities

- Personal protective equipment (PPE) as required by the site-specific Health and Safety Plan
- Environmental materials containers (obtained from EG&G) for non-reusable items required to complete decontamination, and soils dislodged during decontamination
- An organic vapor detector (OVD) and a radiation monitor to screen equipment and environmental materials containers for an estimate of the effectiveness of decontamination efforts

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- Wash and rinse buckets necessary to establish a personal decontamination line
- Any equipment or task specific decontamination fluids required by a SOP or SOPA but that are not listed as being available at the MDF
- Blank environmental materials container labels to replace any completed labels that become dislodged or rendered illegible during the decontamination process

### 5.3 MDF CONFIGURATION

A typical MDF is depicted in Figure FO 12-1, MDF Configuration. A MDF consists of three functional areas, the equipment decontamination pad, the environmental liquids management area, and the drum transfer area.

#### 5.3.1 Equipment Decontamination Pad

The equipment decontamination pad includes a drainage system, a sump for collection of fluid runoff, and a pumping system for moving fluids from the sump to the environmental liquids management area. Wet sediments will be removed from the sump manually.

#### 5.3.2 Environmental Liquids Management Area

The environmental liquids management area consists of large holding tanks enclosed by berms, and sedimentation tanks located between the bermed area and the decontamination pad. All environmental liquids will be emptied into the sedimentation tanks, and when the residual sediments have settled, the relatively sediment free liquids will be pumped from the sedimentation tanks to the large holding tanks.

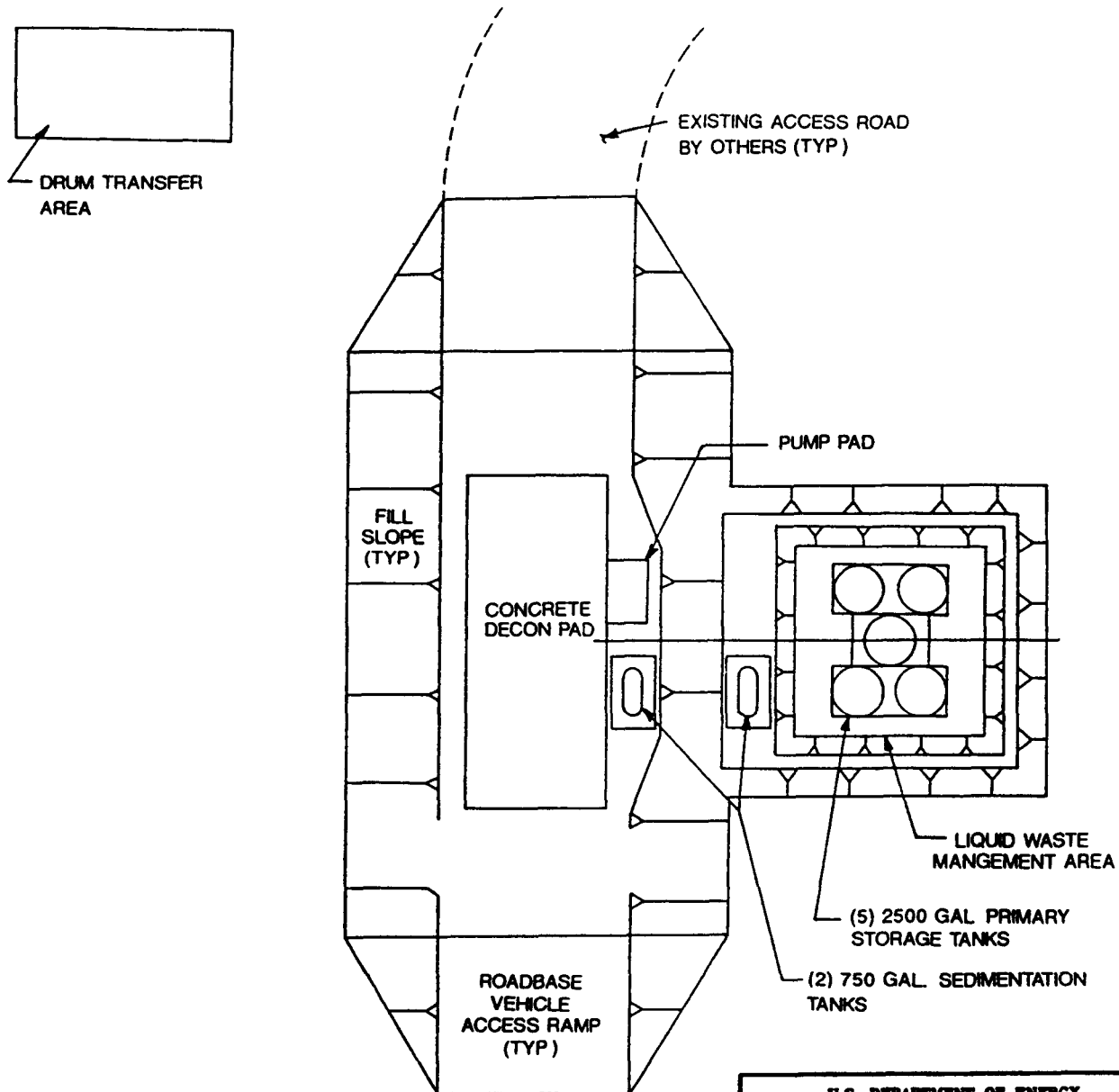
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TYPICAL MDF CONFIGURATION

U.S. DEPARTMENT OF ENERGY  
Rocky Flats Plant, Golden, Colorado  
OPERABLE UNIT 2  
PHASE II RFI/RI WORK PLAN (BEDROCK)

RFP-903 PAD  
DRILLING

Figure FO 12-1

1/24/91

## DECONTAMINATION FACILITY OPERATIONS

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### 5.3.3 The Drum Transfer Area

The drum transfer area is the point at which subcontractors transfer colored drums containing environmental materials suspected of containing radioactive and/or hazardous substances to EG&G representatives. Transfers of filled drums will normally occur when Waste Operations notifies EM personnel that storage space is available. Partially filled environmental materials drums will be stored at a temporary staging area at the drum transfer area until they are retrieved for complete filling. When full, drums will be placed at the designated drum transfer point.

## 6.0 PROCEDURES

### 6.1 INTRODUCTION

Effective decontamination procedures are required to minimize the potential for cross-contamination, offsite contaminant migration, and personnel exposure from improperly decontaminated equipment. Heavy equipment and environmental materials containers may become contaminated in either of the two following scenarios: (1) when used in a work area characterized as potentially contaminated such as an Individual Hazardous Substance Site (IHSS) or (2) when used in a work area characterized as not potentially contaminated but where field monitoring conducted during field activities indicates the possible presence of contamination. Because contamination is not always easily discernible, it will be assumed that equipment used in one of the two preceding scenarios has been contaminated and will, therefore, require decontamination.

Procedures established in this SOP are not applicable for heavy equipment used in a work area characterized as not potentially contaminated where no verified positive detections were encountered during field monitoring. However, heavy equipment used in these work areas may be washed at the MDF Form FO 4A, Heavy Equipment Decontamination/Wash Checklist and Record, Sections I, II, and III, will be completed for heavy equipment decontaminated or washed.



## DECONTAMINATION FACILITY OPERATIONS

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(See SOP FO 4, Heavy Equipment Decontamination)

### 6.2 DESIGNATED SUBCONTRACTOR (DSC)

The subcontractor designated to maintain the MDF is responsible for providing general use equipment as specified in Subsection 5 1, coordinating with MDF users to ensure efficient utilization of the MDF, performing routine maintenance, operations, and minor repairs to equipment and facilities as described below; managing environmental liquids and residual sediments (as described in Subsection 6 5) that are placed at the MDF, and maintaining documentation as described in Section 7 0

#### 6.2.1 Coordinating With MDF Users

The DSC will coordinate with MDF Users by accomplishing the following

- Provide SOP training on the use of the MDF
- Maintaining a roster of MDF users and a point of contact to receive information regarding the operation of the MDF
- Devising and posting a system of priorities for use of the MDF
- Informing other subcontractors of any changes to this SOP
- Scheduling foreseeable periods of "downtime" and notifying other subcontractors of both scheduled and unscheduled periods of "downtime"
- Scheduling use of the rough terrain forklift

## DECONTAMINATION FACILITY OPERATIONS

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### 6.2.2 Routine Maintenance, Operations, and Minor Repairs

At the beginning of each day of EM field operations, the DSC will perform the following

- Visually inspect the MDF to verify that the required equipment and supplies are on-hand
- Reinstall splash screens if they have been removed and repair any tears by applying duct tape or equivalent over the tear on both sides of the curtain
- Perform routine maintenance on equipment by following instructions in the equipment owners manuals
- Fill decontamination fluid and rinse fluid reservoirs
- Pump any liquids in the sedimentation tanks into a holding tank If, after the liquid has been pumped, a sufficient amount of sediment has accumulated, the sediment will be drummed, sampled, and handled as described in Subsection 6 5 4
- When necessary, use the steam generator to deice the MDF
- Complete Form FO 12A Equipment Decontamination Pad Daily Inspection Checklist

## DECONTAMINATION FACILITY OPERATIONS

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At the end of each day of EM field operations, the DSC will perform the following:

- Decontaminate all MDF structural surfaces, powered equipment, and nonpowered equipment
- Use an OVD to monitor the MDF surfaces, then collect and have radiological smear tests counted, as described in SOP FO 16, Field Radiological Measurements. If either the OVD or the smear tests indicate the presence of contamination, the involved surfaces will be decontaminated again and remonitored
- Drain and winterize all equipment that could be damaged internally by the freezing of fluids (Note Ethylene glycol will not be used as an antifreeze in any of the pressurized spray systems)
- Pump any liquids from the floor sump into a decanting tank

### 6.3 MDF USERS

Subcontractors using the MDF are responsible for providing the items specified in Subsection 5.2, conducting decontamination of equipment and verification of decontamination effectiveness as described previously in Subsection 6.1, coordinating with the DSC, notifying the designated EG&G SSO, and conducting operations at the MDF as described below.

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### 6.3.1 Coordinating With the DSC

Before a subcontractor may initially use the MDF, that subcontractor must register with the DSC and designate an employee to serve as a point of contact to interface with the DSC (see subsection 6.2.1). MDF users are to notify the DSC if any above normal usage of the MDF is anticipated.

### 6.3.2 Operations At the MDF

- Splash screens must be closed if pressurized sprays are to be used
- Subcontractors should request that DSC personnel pump the MDF floor drain sump if planned decontamination activities are likely to cause the sump to overflow
- The "buddy system" will be employed while decontamination activities are being conducted with the splash screens closed
- Decontamination procedures for heavy equipment and/or environmental materials containers will preempt equipment washing operations described in Subsection 6.1
- Items from different work areas will not be decontaminated simultaneously within the screened-in area of the MDF
- Each MDF user will steam clean all surfaces within the screened portion of the MDF after each use. Screens used to enclose the decontamination pad and equipment used during equipment decontamination will be steam cleaned.

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### 6.4 PERSONAL DECONTAMINATION

- MDF users will bring a sufficient quantity of containers to the MDF to establish a personal decontamination line as required by the site-specific health and safety plan DSC personnel will decontaminate the personal decontamination containers that hold decontamination and rinse fluids
- DSC personnel will conduct personal decontamination as described in the applicable Health and Safety Plan
- Personal decontamination lines will not be established downwind of any pressurized sprays being used at the MDF

### 6.5 ENVIRONMENTAL MATERIALS HANDLING AND SAMPLING

Environmental materials generated at the MDF will normally fit within one of the following categories

- Unrepairable equipment
- PPE worn by MDF users decontaminating equipment or environmental materials containers
- PPE worn by DSC employees working at the MDF
- Water brought to the MDF by subcontractors and water used to decontaminate equipment and environmental materials containers

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- Sediments in the decontamination pad floor drain sump and sediments in the sedimentation tank's bottom

The handling and sampling of each environmental materials category is described in the following sections. Any subcontractor that anticipates environmental materials other than those listed above will coordinate the proposed handling procedures with the appropriate EG&G representative before implementing the proposed procedures.

### 6.5.1 Unreparable Equipment And PPE Worn By DSC Employees

Unreparable equipment and PPE used by DSC employees working at the MDF will be thoroughly decontaminated and placed in a dumpster for uncontaminated environmental materials.

### 6.5.2 PPE Worn by MDF Users

PPE worn during decontamination of equipment and/or environmental materials containers used in the field will be disposed of in the same manner as PPE used during the field operation that warranted the decontamination activity.

### 6.5.3 Environmental Liquids

Environmental liquids will be emptied into the sedimentation tanks before being pumped into holding tanks. When a holding tank becomes full, the DSC will open the tank, monitor the tank interior with an OVD, and will use a bottom filling bailer or equivalent to collect a sample. Water samples will be analyzed by an EG&G approved laboratory for the target compound list (TCL) volatiles. The sampler will be decontaminated as described in SOP FO.3, General Equipment Decontamination, before and after each sample collection event. The sample will be collected from the middle portion of the tank. As the bailer is removed from the holding tank, its contents will

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be emptied into a sample container and the container sealed. The sample container exterior will then be decontaminated and the sample transferred to the DSC's sample manager for marking and handling as described in SOP FO 13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples. All samples will be marked to reflect the holding tank they were drawn from. After sampling, the tank will be sealed to prevent the addition of more water after sampling has occurred.

Results of sample analysis will be used by an EG&G representative to determine the disposition of the tank's contents. If the total concentration of TCL volatile organics is less than 1 part per million (ppm), the DSC will notify EG&G Waste Operations personnel who will use an appropriately sized water container to transport the holding tank contents to the EG&G evaporation tank. If the total TCL volatile organics concentration is greater than 1 ppm, the DSC will pump approximately one-half of the holding tank's contents into a separate holding tank and then add water from either an unsampled holding tank or from the settling basins. Resampling will be accomplished and the analytical results used to determine how each holding tank's contents will be handled. These procedures will be conducted every time a holding tank becomes full.

#### **6.5.4 Sediments in the Decontamination Pad Floor Drain Sump and Sediments in the Sedimentation Tank Bottoms**

Sediments generated at the MDF will be composited in gray 55-gallon 17C drums. Prior to the filling of the drum, two liters of desiccant will be placed in the bottom of the drum and two additional liters will be put into the drum when the drum has been filled half full. Sediments will be placed in the drum up to approximately two inches from the top. Gray drums used by the DSC will be obtained, marked, and handled as described in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers. At the end of each day of operation, any sediments that remain in the MDF floor drain sump will be placed into the same sedimentation tank as the water that was pumped from the sump. If at the beginning of each day of operation, the depth of

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sediments remaining in the settling basins appears to be sufficient to fill a 55-gallon 17C drum, the sediment will be placed in a drum and representative sediment samples will be collected using the General Sampling Procedure for collecting sediment material (See SOP GW 6, Sediment Sampling) Collected samples will be transferred to the DSC's designated representative to be analyzed for target analyte list (TAL) metals, TCL analytes, volatiles, semi-volatiles, pesticides/PCBs, water quality parameters, pH, nitrate, and percent solids, and radionuclides

### 6.6 DRUM TRANSFER AND DRUM STAGING

The drum transfer area and the drum staging area at the MDF will be identified by signs and each area will be delineated by rope and/or wire

#### 6.6.1 Drum Transfer Procedures

Filled drums will be sealed and marked as described in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers, before being transported to the MDF At the MDF, each subcontractor will decontaminate the exterior of the filled drums (See SOP FO 4, Heavy Equipment Decontamination) and place each drum at the drum transfer area for custody transfer to EG&G Waste Operations Filled drums will be RAD monitored if the containers were found to be radioactively contaminated during field monitoring (see SOP FO 16, Field Radiological Measurements)

Subcontractors will maintain a Drum Field Log Form (See SOP FO 10) on each drum issued to them by EG&G The Drum Field Log Form is partially completed in the field and documents the type of environmental materials contained in the drum When EG&G Waste Operations personnel take custody of the drums, subcontractor personnel will complete the Drum Field Log Form by recording the name of the EG&G representative receiving the drum



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### 6.6.2 Drum Staging Procedures

Partially-filled drums will be sealed and marked as described in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers, before being transported to the MDF. At the MDF, each subcontractor will decontaminate the partially-filled drums (See SOP FO 4, Heavy Equipment Decontamination) and place each partially-filled drum at the drum staging area.

It is the responsibility of each subcontractor to maintain Drum Field Log Forms that correspond to the drums placed at the drum staging area and to retrieve and complete the filling of those drums at the first opportunity. The "first opportunity" is defined as the next field activity likely to generate environmental materials that are suitable for placement in the staged drums.

### 7.0 DOCUMENTATION

The DSC responsible for operation of the MDF will maintain a bound activities log book. The activities log is intended to reflect the daily activities accomplished in order to operate the MDF. Additionally, Form FO 12A, Equipment Decontamination Pad Daily Inspection Checklist, will be completed on a daily basis.

A Drum Field Log Form (Form FO 10A) will be kept on each drum issued to the DSC until the drum is returned to an EG&G representative. A copy of the Drum Field Log Form will be turned into the EG&G representative within a week of being filled.

The DSC will conduct an inspection of the drums within the temporary staging area or any gray drum used for general use. The inspection should be conducted at least weekly. The Drum Inspection Form (Form FO 10B) will be used to document these inspections.

A Contaminant Characterization Form (FO 10C) will be used for the characterization of the

## DECONTAMINATION FACILITY OPERATIONS

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environmental materials generated at the MDF that have been placed in gray drums and are suspected to contain radioactive and/or hazardous substances. (The preceding forms are described in detail in SOP FO 10, Receiving, Labeling, and Handling Environmental Materials Containers.)

## EQUIPMENT DECONTAMINATION PAD DAILY INSPECTION CHECKLIST

## Facility and Equipment Inspection

Date \_\_\_\_\_

Facilities and Equipment Operational \_\_\_\_ Yes \_\_\_\_ No (if no explain and describe corrective action)

The Equipment Decontamination Pad is to be visually inspected at the beginning of each day of Environmental Management (EM) field operations. All deficiencies should be reported to the Decontamination Operations Manager immediately. Decontamination operations should not commence until all deficiencies have been corrected.

## EQUIPMENT DECONTAMINATION PAD

ACCEPT

NONACCEPT

COMMENTS

- 1) Check fill slope for excessive erosion or cracking.
- 2) Check fill slope for unusual staining which may be indicative of leakage.
- 3) Check copolymer pad coating for cracking, peeling, bubbling, staining, or any unusual appearance.
- 4) Check concrete decontamination pad for cracking, chipping, spalling, or any unusual appearance.
- 5) Check that floor sump has been pumped clean of any liquids.
- 6) Check splash screens for any tears and inspect integrity of previous repairs.
- 7) Inspect all tanks, joints, gauges, pipes, and couplings for any drips, leaks, residues, or signs of corrosion.
- 8) Inspect berms around environmental liquids management area for breaches, cracks, and/or signs of excessive erosion.
- 9) Estimate the remaining capacity in each of the environmental liquids tanks as well as the sedimentation tanks.
- 10) Make sure decontamination fluid and rinse fluid reservoir levels are adequate.
- 11) Check tank tie downs and make sure they are tight.
- 12) Inspect monitor pipe weekly for fluid leaking to the inner liner.
- 13) Ensure that all signs and labels are in place.


## MDF Waste Management Activities

Liquid Waste Holding Tanks Sampled \_\_\_\_\_

Tank(s) Number(s) \_\_\_\_\_

MDF Pad Sampling Liquid Pumped and Dredger Removed? \_\_\_\_ Yes \_\_\_\_ No (if No explain)

## Results of MDF Facility and Equipment Monitoring.

OVD \_\_\_\_\_ RAD \_\_\_\_\_

(Name) \_\_\_\_\_

(Subcontractor) \_\_\_\_\_

(Phone) \_\_\_\_\_

(Signature) \_\_\_\_\_

This is a  
**CONTROLLED DOCUMENT**

EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

This is a **REVISION** CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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TITLE  
CONTAINERIZATION, PRESERVING,  
HANDLING AND SHIPPING OF  
SOIL AND WATER SAMPLES


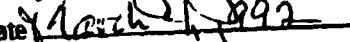
Approved By

  
(Name of Approver)

**MAY 12 1992**  
(Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By   
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### LIST OF FIGURES

FIGURE FO 13-1 SAMPLE COMPLETED COC FORM 11

### LIST OF APPENDIXES

APPENDIX FO 13A NON-RADIOLOGICAL AND RADIOLOGIC TABLES

### LIST OF TABLES IN APPENDIX FO.13A

TABLE A-1 SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING  
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TABLE A-2 SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING  
TIMES FOR TARGET COMPOUNDS AND TARGET ANALYTE TESTS

TABLE A-3 SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING  
TIMES FOR RADIOLOGICAL SAMPLES - WATER MATRIX

TABLE A-4 SAMPLE CONTAINERS, SAMPLE PRESERVATIONS, AND SAMPLE HOLDING  
TIMES FOR RADIOLOGICAL SAMPLES - SOIL MATRIX

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### 2 0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats to define the SOPs addressing sample containers, preservatives, handling, packaging and shipping of soil/sediment and water samples collected at the Rocky Flats Plant (RFP)

### 3 0 RESPONSIBILITIES AND QUALIFICATIONS

All personnel performing these procedures are required to have the appropriate health and safety training as specified in the site-specific Health and Safety Plan. In addition, all personnel are required to have a complete understanding of the procedures described within this SOP and receive specific training regarding these procedures.

Only qualified personnel will be allowed to perform these procedures. Required qualifications are based on minimum of a two year science related degree and/or education, previous experience, on-the-job training, and supervision by an onsite chemist. The subcontractor's project manager will document personnel qualifications related to this procedure in the subcontractor's project QA files.

### 4 0 REFERENCES

#### 4 1 SOURCE REFERENCES

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987

DOE 1987 The Environmental Survey Manual DOE/EH-0053, Volumes 1-4 August 1987

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final October 1988

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RCRA Facility Investigation Guidance, Interim Final May 1989

Rocky Flats Plant Environmental Restoration Program, Quality Control Plan January 1989

Technical Enforcement Guidance Documentation (TEGD) USEPA 1986

Test Methods for Evaluating Solid Waste, Volume II Field Manual Physical/Chemical Methods  
USEPA SW-846 3rd Edition November 1986

User's Guide to the Contract Laboratory Program USEPA December 1988

### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are

- SOP FO.3, General Equipment Decontamination
- SOP FO 14, Data Base Management
- SOP GW 6, Groundwater Sampling
- SOP GT 8, Surface Soil Sampling
- SOP SW 6, Sediment Sampling
- SOP SW.3, Surface Water Sampling
- SOP SW 7, Collection of Tap Water Samples
- SOP SW 8, Pond Sampling
- SOP SW 9, Industrial Effluent and Pond Discharge Sampling

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### 5.0 EQUIPMENT

#### 5.1 EQUIPMENT LIST

The following list of equipment is not intended to be task specific. The equipment and materials shown are the minimum that may be needed to ensure that proper procedures are followed for sample handling, packaging, and shipping.

- Sample containers/bottles
- Coolers
- Thermometer
- Blue ice
- Sample labels
- COC forms
- Decontamination equipment<sup>1</sup>
- Preservatives
- Baggies for containers
- Bubble wrap
- Vermiculite or equivalent
- Strapping and clear tape
- Custody seals
- Garbage bags
- Metal paint cans<sup>2</sup>

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<sup>1</sup> Decontamination equipment and procedures are thoroughly discussed in the SOP FO.3, General Equipment Decontamination

<sup>2</sup> Large enough to accommodate sample containers



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Appropriate uses for the equipment listed are detailed in the following sections of this SOP

### 5.2 DEPARTMENT/OFFICE CONTACT LIST

EG&G or its designee is responsible for providing the appropriate documentation for RAD screening, and monitoring of all field samples for shipment off site

The on-site General Laboratories will need to be contacted before sample shipment for radiological screening and categorization of field samples

### 6.0 PROCEDURES

Procedures for the containerizing, preserving, handling and shipping of soil and water samples detailed in this SOP follow strict criteria of the USEPA's Contract Laboratory Program. This SOP is intended to present general guidelines for proper sample handling and any deviations or modifications will be documented in the Scope of Work or specific Task Order as well as SOP addendum forms.

### 6.1 SAMPLE CONTAINERS AND PRESERVATIVE

Only sample containers certified as clean by the manufacturer will be used for sample collection. The containers and preservatives may be obtained from the contracted analytical laboratory, their designated supplier, or a suitable chemical supply company. Any preservative(s) required may be added to the container by the contracted analytical laboratory, field sampling team, sample manager, and/or on-site chemist prior to or during sample collection.

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The matrices discussed in this SOP for chemical and radiological parameters are

Soil Matrix - to include soils, sediments, and sludges (see SOP GT 8, Surface Soil Sampling, SOP SW 6, Sediment Sampling)

Water Matrix - to include surface water, groundwater and process liquids (see SOP GW 6, Groundwater Sampling, SOP SW 3, Surface Water Sampling, SOP SW 7, Collection of Tap Water Samples, SOP SW 8, Pond Sampling, and SOP SW 9, Industrial Effluent and Pond Discharge Sampling)

Tables A-1 and A-2 show both CLP and non-CLP parameters of interest for water and soil matrices with the associated container size, preservatives (chemical and/or temperature), and holding times. Tables A-3 and A-4 show radiological parameters, containers, preservatives, and holding times for water and soil matrices.

### 6.2 CONTAINER LABELING, DECONTAMINATION, AND FIELD PACKAGING

The sample bottles will be labeled by the sample manager or field sampling team. Collection time and date will be completed in the field by the sampler. The labels will indicate

- Activity name and/or number
- Unique sample number
- Sample time and date
- Chemical preservative used
- Sample type (grab, composite)
- Analyses required
- Filtered/unfiltered

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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A sample is considered to be in a person's custody if any of the following conditions are met

- The sample is in the person's physical possession
- The sample is in line of sight of the person after he/she has taken possession
- The sample is secured by that person so that any tampering can be detected
- A sample is secured by the person in possession in an area which only authorized personnel can enter

### 6.3.1 Tampering of Sample Containers

If, at any time after samples have been secured, custody seals are identified as having been tampered with, this procedure will be followed to ensure that sample integrity has not been compromised

- Check cooler temperature to verify 4°C
- Check with all personnel having access to sample coolers to verify possible inadvertent tampering
- Check every sample container for any signs of tampering, such as loose lids, foreign objects in containers, broken or leaking containers, etc.
- Check to ensure adequate and appropriate packaging
- Document all findings of the incident in the sample manager's field log book

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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If it is determined that malicious tampering of samples has occurred and/or it is believed that sample integrity has been compromise the subcontractor will immediately contact EG&G

If it can be determined that sample integrity has not been compromised based on the above criteria, document findings in sample manager's field logbook and proceed with this standard operating procedure

### 6.3.2 Chain of Custody Form

The four-page carbonless COC Form (Form FO 13A) is shown in Section 8 0, Documentation. An example of a completed COC Form is illustrated in Figure FO 13-1. The original and second (yellow) copy will be included with the samples to be shipped enclosed in a plastic bag and taped inside the lid of the cooler. The third (pink) copy along with a photocopy of the original will remain on file at the subcontractors on-site facility. The fourth (goldenrod) copy is for EG&G project managers requesting copies. The contract laboratory will sign as having received the samples and return the yellow copy of the COC to the project management office for verification by the QA/QC officer or their designee. The yellow and pink copies will then be matched and filed to complete the chain of custody procedure.

The chain of custody form will include the following information

- Unique sample number and sample location
- Project number
- Date and time of sample collection
- Signature of collector or field custodian
- Laboratory designation
- Sample matrix
- Condition of sample on receipt at the laboratory

CONTRACTOR Webeegood      SAMPLERS Jim Fine, Fred Good      PROJECT # 4000-0  
SITE CONTACT/PHONE Sample Manager      LAB/LOCATION FYI Labs / Flint, Mich      966-1234

**C-O-C NUMBER**

## EG&G ROCKY FLATS, CHAIN OF CUSTODY

[illegible]

## SHIPMENT METHOD

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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- Chain of custody control number
- Signature and date blocks for personnel relinquishing or receiving sample custody
- Space for additional comments
- Name and phone number of emergency contact person
- Analysis requested
- Out of spec reporting

### 6.4 FIELD DATA DOCUMENTATION

All field descriptions, measurements, and observations will be recorded on the appropriate field data forms (see specific sampling SOPs and SOP FO 14, Field Data Management) in accordance with SOP FO 2, Field Data Documentation. The original data forms will be collected and filed on site by the designated subcontractor's data entry personnel. These forms are to be bound and submitted to EG&G with an accompanied transmittal letter at the completion of the task. This form is an example of data entries required for the Rocky Flats Environmental Data System (RFEDS) database. Data may also be recorded in field logbooks if desired. Field data will be filled out at the time a sample is taken and will include, but not be limited to, the following information:

- Sampling activity name and number
- Sampling point name and number
- Sample number\*
- Name(s) of collector(s) and others present
- Date and time of sample collection\*
- Sample container tag/label number (if appropriate)\*
- Preservative(s) used\*
- Requested analyses\*

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\* Items will be documented on the COC Form

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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- Sample matrix
- Filtered/unfiltered
- Designation of QC samples (ONLY for MS and MSD)
- Collection methods
- Chain of custody control numbers
- Field observations and measurements during sampling (comment section)
- Signature of responsible observer

### 6.5 PACKAGING AND SHIPPING

Prior to commencement of field activities, estimated levels of chemical and/or radiological contaminants will be determined from known historical data for all matrices to be sampled by EG&G or its designee. This SOP addresses procedures for low, medium, and high level concentrations. The three levels of concentrations are defined as follows:

- Low-Concentration Samples - The contaminant of highest concentration is present at less than 10 parts per million (ppm). Examples include background environmental samples.
- Medium-Concentration Samples - The contaminant of highest concentration is present at a level greater than 10 ppm and less than 150,000 ppm (0.001 - 15 percent). Examples include material that is obviously weathered.
- High-Concentration Samples - At least one contaminant is present at a level greater than 150,000 ppm (15 percent). Samples from drums and tanks are assumed to high concentration unless information indicates otherwise.

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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Radiation screening of field samples as determined by EG&G and their subcontractors will be sent to the on-site General Laboratory. When the on-site General Laboratory cannot process the sample, a 40 ml aliquot of sample is sent to an EG&G designated offsite laboratory. The remainder of the sample is kept at the subcontractor's field facilities until results are reported back to the subcontractor. The Rad screening procedures determine which laboratory receives samples based on results of greater than (GT) OR less than (LT) 50 picocuries/liter for waters or 50 picocuries/gram for soils. The Rad screening procedures will also enable the subcontractor to follow applicable Department of Transportation (DOT) guidelines for shipment of these environmental samples.

All sample containers will have been decontaminated and bagged in the field. Upon receipt and verification of sample containers and COC forms, the following steps will be taken:

- The designated laboratory will be notified prior to shipment if samples collected in the field are suspected of containing any other substance for which the laboratory personnel should take additional safety precautions.
- Subcontractors are responsible for radiologically clearing all containers prior to shipment off site in accordance with Environmental Monitoring Radiological Guidelines (EMRD) HSP 18 10, Health and Safety Practices Manual (HSP).
- Obtain property passes signed by the Construction Management Coordinator and the Radiation Site Survey Officer and/or subcontractors radiation monitor so that coolers may be shipped off site.
- Line the sample cooler with a large plastic bag.
- Place approximately 3 inches of vermiculite in the bottom of the cooler.



## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

EG&G ROCKY FLATS PLANT EMD MANUAL OPERATION SOP	Manual. Procedure No . Page Effective Date: Organization:	5-21000-OPS FO 13, Rev 2 15 of 18 March 1, 1992 Environmental Management
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- Wrap glass containers in bubble pack
- Verify that all samples requiring screening have reported estimated radiological activity levels
- Place bagged and wrapped sample containers (except VOC vials) upright in the cooler with approximately 1 inch between them
- Place bagged and wrapped sample containers upright, except for the volatile organic compounds (VOC) vials in the cooler with approximately 1 inch between them and the sides of the cooler
- Fill the cooler approximately three-quarters full of vermiculite, making sure that sample containers are securely packed
- Insert the two VOC vials upright in the center of the cooler
- Fill the cooler with vermiculite, allowing adequate space at the top for blue ice
- Bag the blue ice (or equivalent) and place several packages in the top space of the cooler\*\*
- Seal the signed COCs in a plastic bag and tape it to the underside of the lid of the cooler
- Tape the drain of the cooler shut

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\*\* See Appendix A, Tables 1 and 2 for parameters requiring  $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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- Wrap strapping tape around the cooler in two locations to secure the lid
- Place the airbill on top of the cooler. If more than one cooler is sent to the same laboratory, an address label and a manifest label are needed
- Place "This Side Up" and "Fragile" labels on the top and two sides of the cooler
- Place "↑" labels on all four sides of the cooler
- Place "Environmental Samples" labels on top of cooler. For coolers weighing over 75 pounds, an additional "Heavy Weight" label is required in the two opposite corners on top of the cooler
- Place signed and dated custody seals in two locations sealing the cooler lid so that tampering will be evident

The following steps will be taken for samples suspected of containing both medium and/or high level concentrations

- Enclose all sample containers in clear plastic bags
- Pack all medium and high level water and soil samples in metal paint can
- Label paint cans with sample number of sample contained inside
- Surround contents of can with non-combustible, absorbent packing material
- Use freezer packages cool samples to 4°C

## CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES

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- Pack sealed paint cans or plastic-enclosed sample bottles in shipment container
- Use a plastic or metal ice chest for shipment (do not use cardboard or styrofoam containers to ship samples)
- Surround contents with non-combustible, absorbent packing material (do not use earth or ice packing materials)
- Tape paperwork in plastic bags under cooler lid
- Close cooler and seal with custody seals

Sample coolers may be received by courier at a predetermined area at RFP. If arrangements cannot be made, a company vehicle is required to deliver sample coolers to the laboratory and/or courier office.

### 7.0 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES

Quality Assurance (QA) and Quality Control (QC) will be administered according to the Quality Assurance Project Plan (QAPjP), the project-specific Quality Assurance Addendum (QAA), and QC requirements presented in this SOP.

### 8.0 DOCUMENTATION

Documentation of observations and data acquired in the field will provide information on the handling and preparation of the samples collected in addition to a permanent record. Sampling personnel will be responsible for documenting the handling, preparation, packaging, and shipping of the samples. These observations and data will be recorded with black waterproof ink on subject

## **CONTAINERIZATION, PRESERVING, HANDLING AND SHIPPING OF SOIL AND WATER SAMPLES**

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specific data sheets, (i.e. instrument calibration data sheet, field measurement data sheet and/or field logbooks)

Copies of the chain of custody records for the samples shipped during the data collection task will be kept on file at the site office and the subcontractor's main office

SITE CONTACT / PHONE

LAB/LOCATION:

C-O-C NUMBER

## EG&G ROCKY FLATS, CHAIN OF CUSTODY

BOTTLE CODES PRESERVATIVE	
	NUMBER OF CONTAINERS MEDIA SOIL(S) WATER (W) FILTERED-F POT DISS-P TURN AROUND RUSH -R OUT OF SPEC REPORTS

DATE/TIME	SAMPLE NUMBER	LOCATION	CONTAINER TYPE
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[illegible][illegible]

RELINQUISHED BY	DATE/TIME		RECEIVED BY	DATE/TIME		LABORATORY USE ONLY		Y		N	
								PCKG REC'D/CUSTODY SEALS INTACT			
								SAMPLE LABELS/COCs AGREE			
								TEMPERATURE WITHIN SPECIFICATION _____C			
								CORRECTED COPY ATTACHED			
REMARKS						PROBLEMS OR DISCREPANCIES					

REMARKS	* INDICATES FILTERED SAMPLE (1) • CS 134 WHEN BY GAMMA
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SHIPMENT METHOD

PROJECT # \_\_\_\_\_

**LAB/LOCATION:**

V	D
---	---


## SHIPMENT METHOD

PROJECT # \_\_\_\_\_

PROJECT #

LAB/LOCATION\_\_\_\_\_

C-O-C NUMBER

## EG&G ROCKY FLATS, CHAIN OF CUSTODY

[illegible]

## SHIPMENT METHOD

**APPENDIX FO.13A**  
**NON-RADIOLOGICAL AND RADIOLOGICAL TABLES**



TABLE A-1  
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR  
TARGET COMPOUND AND TARGET ANALYTE LISTS

WATER MATRIX

Parameter	Container	Preservative	Holding Time
<u>Liquid - Low to Medium Concentration Samples</u>			
<b>Organic Compounds.</b>			
Purgeable Organics (VOCs)	2 x 40-mL VOA vials with teflon lined septum lids	Cool, 4°C <sup>a</sup>	7 days
Extractable Organics (BNAs), Pesticides and PCBs	1 x 4-L amber <sup>b</sup> glass bottle	Cool, 4°C <sup>a</sup>	7 days until extraction, 40 days after extraction
Organophosphorus Pesticides and Herbicides	1 x 4-L amber <sup>b</sup> glass bottle	Cool, 4°C	7 days until extraction, 40 days after extraction
Dioxins/Furans	2 x 1-L amber <sup>b</sup> glass bottles	Cool, 4°C	7 days until extraction, 40 days after extraction
<b>Inorganic Compounds</b>			
Metals (TAL)	1 x 1-L polyethylene bottle	Nitric acid pH < 2	6 mo <sup>c</sup>
Cyanide	1 x 1-L polyethylene bottle	Sodium hydroxide <sup>d</sup> pH > 12, Cool, 4°C	14 days
Sulfide	1 x 500 ml polyethylene bottle	mL-zinc acetate and sodium hydroxide to pH > 9, Cool, 4°C	7 days

<sup>a</sup>Add 0.008% sodium thiosulfate (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) in the presence of residual chlorine

<sup>b</sup>Container requirement is for any or all of the parameters given

<sup>c</sup> Holding time for mercury is 28 days

<sup>d</sup> Use ascorbic acid only if the sample contains residual chlorine greater than 0.2 mg/l. Test a drop of sample with potassium iodine-starch test paper; a blue color indicates need for treatment. Add ascorbic acid, a few crystals at a time, until a drop of sample produces no color on the indicator paper. Then add an additional 0.6g of ascorbic acid for each L of sample volume.

TABLE A-1 (continued)  
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES  
FOR MISCELLANEOUS PARAMETERS

WATER MATRIX

Parameter	Sample Volume/ Container <sup>a</sup>	Preservative	Holding Time
<u>Liquid - Low to Medium Concentration Samples</u>			
Acidity	200 mL/P, G	Cool, 4°C	14 days
Alkalinity	200 mL/P, G	Cool, 4°C	14 days
Bacteriological	1 L/P, G	Cool, 4°C	6 hr
Static Bioassay	4 L	Cool, 4°C	48 hr
Biochemical Oxygen Demand (BOD)	2 L/P, G	Cool, 4°C	48 hr
Chemical Oxygen Demand (COD)	300 mL, P, G	Cool, 4°C, Sulfuric Acid to pH < 2	28 days
Chloride	200 mL/P, G	None	28 days
Chlorine Residual	In situ, beaker or bucket	None	Analyze immediately
Color	200 mL	Cool, 4°C	48 hr
Conductivity	300 mL/P, G	Cool, 4°C	28 days (determine on-site if possible)
Chromium, Hexavalent	200mL/P, G	Cool, 4°C	24 hr
Dissolved Oxygen (DO) (Probe)	In situ, beaker or bucket	None	Determine on-site
Dissolved Oxygen (DO) (Winkler)	300 mL glass, BOD bottle	Fix on site, store in dark	8 hr (deter- mine on-site if possible)

<sup>a</sup> P = Plastic (polyethylene)  
G = Glass  
BOD = Biological Oxygen Demand

TABLE A-1 (continued)

SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES  
FOR MISCELLANEOUS PARAMETERS

## WATER MATRIX

Parameter	Sample Volume <sup>a</sup> /Container	Preservative	Holding Time
<u>Liquid - Low to Medium Concentration Samples (continued)</u>			
Toxicity Characteristic Leaching Procedure (TCLP)	4 L amber glass	Cool, 4°C	Extract within 7 days, analyze within 40 days
Fluoride	1 L/P	None	28 days
Hardness	300 mL/P, G	1:1 Nitric Acid, pH < 2	6 mo
Nutrients <sup>b</sup>	2 L/P, G	1:1 Sulfuric Acid, pH < 2, Cool, 4°C	28 days
Oil and Grease	1-L widemouth amber glass with Teflon liner	1:1 Sulfuric Acid, pH < 2, Cool, 4°C	28 days
Organic Halides - Total (TOX)	250 mL amber glass with Teflon lined septum closure	Sulfuric Acid, pH < 2, Cool, 4°C	14 days
pH	In situ, beaker or bucket	None	Analyze Immediately
Phenols	1-L amber glass with Teflon lined closure	1:1 Sulfuric Acid, pH < 2, Cool, 4°C	28 days
Phosphate-Ortho	1-L/P, G	Cool, 4°C	48 hr
Phosphorus, Total Dissolved	500 mL/P, G	1:1 Sulfuric Acid, pH < 2, Cool, 4°C	28 days

<sup>a</sup> P = Plastic (polyethylene), G = Glass<sup>b</sup> May include nitrogen series (ammonia, total Kjeldahl, nitrogen, nitrate-nitrite), total phosphorus, chemical oxygen demand

TABLE A-1 (continued)

SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES  
FOR MISCELLANEOUS PARAMETERS

WATER MATRIX

Parameter	Sample Volume/ <sup>a</sup> Container	Preservative	Holding Time
<u>Liquid - Low to Medium Concentration Samples (continued)</u>			
Solids, Settleable	2 L/P, G	Cool, 4°C	48 hr
Solids (Total and Suspended, etc )	1 L/P, G	Cool, 4°C	7 days
Sulfates	500 mL/P, G	Cool, 4°C	28 days
Sulfides	500 mL/P, G	2 mL Zinc Acetate and Sodium Hydroxide to pH > 9 Cool, 4°C	7 days
Temperature	In situ, beaker or bucket	None	Analyze Immediately
Turbidity	200 mL/P, G	Cool, 4°C	48 hr

Note When nonspecific container type is listed (e g , 8-oz wide-mouth glass jar), select a container appropriate to the volume and container requirement given. Samples for more than one parameter can be collected into a single container if container and preservation requirements are the same (e g , sulfate and turbidity)

<sup>a</sup> ASAP = as soon as possible  
NS = not specified  
P = Plastic  
G = Glass

TABLE A-2  
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES  
FOR TARGET COMPOUND AND TARGET ANALYTE LISTS

SOIL MATRIX

Parameter	Container	Preservative	Holding Time
<u>Soil, Sediment or Sludge Samples - Low to Medium Concentrations</u>			
<b>Organic Compounds:</b>			
Purgeable Organics (VOCs)	120-mL capped core	Cool, 4°C	7 days
Extractable Organics (BNAs), Pesticides and PCBs	1 x 8-oz wide-mouth glass jar	Cool, 4°C	7 days until extraction, 40 days after extraction
Organophosphorus Pesticides and herbicides	1 x 8-oz wide-mouth <sup>b</sup> glass jar	Cool, 4°C	7 days until extraction, 40 days after extraction
Dioxins/Furans	1 x 8-oz wide-mouth glass jar	Cool, 4°C	7 days until extraction, 40 days after extraction
<b>Inorganic Compounds</b>			
Metals (TAL)	1 x 8-oz wide-mouth glass jar	None	6 mo <sup>b</sup>
Cyanide	1 x 8-oz wide-mouth glass jar	None	14 days
Sulfide	1 x 8-oz wide-mouth glass jar	None	7 days

<sup>b</sup>Holding time for mercury is 28 days

TABLE A-2 (continued)  
SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES FOR  
MISCELLANEOUS PARAMETERS

SOIL MATRIX

Parameter	Sample Volume /Container	Preservative	Holding Time
<u>Soil, Sediment or Sludge Samples - Low to Medium Concentrations</u>			
Toxicity Characteristic Leaching Procedure (TCLP)	8-oz wide-mouth glass with Teflon®-lined lid closure	None	Extract 7 days, Analyze within 40 days
Nutrients, including Nitrogen, Phosphorus, Chemical Oxygen Demand	8-oz wide-mouth glass with Teflon®-lined closure	None	ASAP <sup>a</sup>
Other Inorganic Compounds	8-oz wide-mouth glass with Teflon®-lined closure	None	ASAP <sup>a</sup>

Note When no specific container type is listed (e g , 8-oz wide mouth glass jar), select a container appropriate to the volume and container requirements given. Samples for more than one parameter can be collected into a single container if container and preservation requirements are the same.

<sup>a</sup>ASAP = as soon as possible

**TABLE A-3**  
**SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING TIMES**  
**FOR RADIOLOGICAL SAMPLES**

**WATER MATRIX**

Parameter	Container	Preservative	Holding Time
Radiological tests <sup>a</sup>	3 x 4L plastic containers <sup>b</sup>	HNO <sub>3</sub>	6 mo
Tritium	125 mL glass	None	None

<sup>a</sup> For Radiological Testing, the specific analyses will be defined as some or all of the following: Gross Alpha, Gross Beta, Uranium 233 + 234, 235 and 238, Americium 241, Plutonium 239 + 240, Tritium, Strontium 90, 89, Cesium 137, Radium 226, 228

<sup>b</sup> Full suite

**TABLE A-4**  
**SAMPLE CONTAINERS, SAMPLE PRESERVATION, AND SAMPLE HOLDING**  
**TIMES FOR RADIOLOGICAL SAMPLES**

**SOIL MATRIX**

Parameter	Container	Preservative	Holding Time
Radiological tests <sup>a</sup> and Tritium	500 mL wide mouth glass <sup>b</sup>	None	None

<sup>a</sup> For Radiological Testing, the specific analyses will be defined as some or all of the following: Gross Alpha, Gross Beta, Uranium 233 + 234, 235 and 238, Americium 241, Plutonium 239 + 240, Tritium, Strontium 90, 89, Cesium 137, Radium 226, 228

<sup>b</sup> Full suite



This is a  
**CONTROLLED DOCUMENT**

EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

This is a RED Stamp

**FIELD DATA MANAGEMENT**

EG&G ROCKY FLATS PLANT  
EMD MANUAL OPERATION SOP

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Category 2

TITLE  
FIELD DATA MANAGEMENT

Approved By

(Name of Approver)

MAY 12 1992

(Date)

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REVIEWED FOR CLASSIFICATION/UCNI

By

Date

By TH [Signature]  
Date March 4, 1992

## FIELD DATA MANAGEMENT

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APPENDIX FO 14A    RFEDS SAMPLE NOMENCLATURE CONVENTION

A-1

## FIELD DATA MANAGEMENT

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at the Rocky Flats Plant (RFP) to provide an orderly method by which field data will be recorded, entered into electronic form, validated, transferred, and filed. This applies to field data generated by any field-related sampling activities performed for the Rocky Flats Environmental Management (EM) Program. This procedure encompasses the data handling process from the point of data collection by field personnel to the filing and transmission of data to EG&G personnel.

This SOP describes hardware and software requirements, field data collection, data entry, data verification, data archiving, and filing that will be used for field data collection and documentation to attain acceptable standards of accuracy, precision, comparability, representativeness, and completeness.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

The designated subcontractor has the overall responsibility for implementing this SOP. The subcontractor's project manager will be responsible for assigning project staff to implement this SOP and for assuring that the procedures are followed by all subcontractor personnel.

The personnel responsible for maintaining the data in the data base will have, at a minimum, a two-year degree in Computer Science or 4 years relevant experience, a working knowledge of DOS, data bases, DBASE III and IV, Lotus 1-2-3, and personal computers. If personnel are used who do not have this background, appropriate training will be provided by the sub-contractor.

EG&G will be responsible for maintaining the RFEDS data base. EG&G will control all updates and fixes to the software. Any program updates will be provided to all subcontractors who are required to use the RFEDS data base.

## FIELD DATA MANAGEMENT

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### 4.0 REFERENCES

#### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA Interim Final October 1988

RCRA Facility Investigation Guidance (EPA) Interim Final May 1989

Rocky Flats Plant Environmental Restoration Program Quality Control Plan Rockwell International January 1989

The Environmental Survey Manual DOE/EH-0053 Volumes 1-4 August 1987

#### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows

- SOP FO 13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples
- SOP GT 1, Logging Alluvial and Bedrock Material
- SOP GT.2, Drilling and Sampling Using Hollow Stem Auger Techniques
- SOP GT 4, Rotary Drilling and Rock Coring
- SOP GT 7, Logging and Sampling of Test Pits and Trenches

## FIELD DATA MANAGEMENT

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- SOP GT 8, Surface Soil Sampling
- SOP GT 9, Soil Gas Sampling and Field Analysis
- SOP GW 1, Water Level Measurements in Wells and Piezometers
- SOP SW 4, Discharge Measurement
- SOP GW 6, Groundwater Sampling
- SOP SW 7, Collection of Tap Water Samples

### 5 0 PROCEDURES

This procedure is based primarily on the Rocky Flats Environmental Data System User's Manual and conversations held with representatives from EG&G

### 5 1 HARDWARE AND SOFTWARE REQUIREMENTS

The purpose of this section is to define the minimum computer system required for the entry and transfer of the field data to EG&G

- 80286 based micro computer
- 1 parallel port
- 5 1/4 high density disk drive or 3 1/2 high density disk drive
- 40 MB hard-disk drive
- EGA or VGA monitor and compatible drive
- 80-column printer
- 2 MB RAM memory
- Lotus 1-2-3
- DOS, version 3.31 or higher
- DBASE IV
- 60 MB backup tape drive

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These requirements may be changed, when necessary, by RFP to comply with their available data transfer needs. RFP will inform all subcontractors of any necessary changes by way of a memo.

### 5.2 FIELD DATA COLLECTION

All data collected from the field will be recorded on preprinted forms. At a minimum, the sample number, site designation, and initials of the collector will be recorded on the form. To the extent possible, the format of the form will be in the same order as the electronic form in the data base. This will assist the field personnel in entering data into the data base with more efficiency and accuracy. Appendix FO 14A is an example of the field data transmittal form. See Section 7.0 for samples of the RFEDS data entry forms.

### 5.3 DATA RECEIPT AND COMPLETENESS CHECK

The purpose of the receipt and checking is to start the verification process by receiving and briefly reviewing the data. The preliminary verification will be conducted as soon as possible after receipt of the completed data forms. This task ensures that the forms are complete before entry into the data base.

- The field data form will be delivered to the designated staff person by the field personnel by the end of each day of field operations.
- The designated staff person receiving the form will initial and date the form upon receipt.
- Upon receipt, all forms will be checked for completeness. The Site Supervisor will be consulted to verify that all of the field forms have been received. At this time, any discrepancies will be discussed with the field personnel and clarified or completed.

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immediately Any changes to the field forms will be initialed and dated by the person making the changes

- The following forms will be included with the field data package
  - Field data transmittal form
  - Appropriate field data forms, depending on the sampling activity
  - Chain of Custody form(s)

### 5.4 TECHNICAL DATA VERIFICATION

When the data completeness has been verified, a technical verification will be performed on the data by a qualified verifier. This person will be able to technically review the data to ensure that the data are consistent with known chemical and physical properties of the media being sampled. For example, if the dissolved oxygen has a reading of 15, there is an indication of a problem since this is above the level of saturation. The verifier will check all calculations and reported units and all of the data on all of the forms. If the verifier detects an error in the data report sheet, the verifier must confer with the field sampler and the project manager prior to changing any information. Any change made must be reflected in the project manager's logbook.

### 5.5 DATA ENTRY

Once the field data have been reviewed and found to be complete, the data will be input to the Rocky Flats Environmental Data System (RFEDS) using the field data entry module.

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Field tracking information will be entered simultaneously into the RFEDS Field Tracking Module provided by EG&G. This form tracks sample collection and shipping data, including:

- Sample number
- Sample location
- Bottle code and analyte group
- Shipper's initials
- Date sampled
- Date shipped
- Lab
- Chain of custody (COC) number

Note The preceding data tracking information is documented on the COC form, therefore, the COC form can be used to facilitate data entry.

### 5.6 DATA VERIFICATION

This step ensures that the data recorded in the electronic data base are the same as the data recorded on the field data forms.

#### 5.6.1 Field Data

When all of the data for the day have been entered into the data base, the data will be printed using the report option of the data base program. The reports (Forms FO 14B through N, see Section 7.0) will then be delivered along with the original field data forms to the designated data verification person. Under no circumstance will the data verifier be the same as the person who entered the data originally.



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The original field data form and the printed report will be compared for accuracy. If transcription errors are found, the errors will be highlighted on the printed report and returned to the data entry person for corrections. Errors will be corrected and a new copy of the report will be generated at this time and the old copy destroyed. This process will be repeated until the printed reports match the field data forms. When the verification process is complete, the verifier will initial and date both the original field forms and the printed report.

### 5.6.2 Borehole Data

The borehole module is integrated with the geologic logging package to aid in the creation of a graphic borehole logs using LOGGER software. The procedure for inputting, verifying and delivering this data is different than for other modules within the field data entry module.

Data entry within the borehole module is done in the same way as the rest of the field data entry module. However, the data verification effort will take place at two stages. After data has been entered into the field module, a QA/QC report will be generated which displays the data from all the borehole forms in one report.

After the data has been verified from the QA/QC report, the data for a given well can be converted into LOGGER format. Once the data has been converted, a graphic geologic log will be generated. This log will then be verified to see that the information is complete. After log verification is complete, a printout of the log will be sent to EG&G for approval. Once this draft log has been approved, the LOGGER log file will be delivered to EG&G. The data from the borehole portion of the RFEDS field module will also be output to a diskette by individual well number and delivered to EG&G.

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### 5 6.3 Tracking Data

The sample tracking information will be entered into the RFEDS Field Tracking Module. When all tracking data has been entered, it will be printed and verified as described above.

When all of the appropriate data are entered into the RFEDS tracking form, it will be printed and given to the person responsible for verifying the data. This subtask will be done at the same time as the field data reports. Under no circumstance will the data verifier be the same as the person who entered the data originally.

When the verification process is complete, the printed form will be initialed and dated by the verifier.

### 5 7 DATA ARCHIVING AND FILING

Upon completion of the daily verification, a copy of RFEDS field data reports will be made. The initialed, dated reports will then be filed with the original field data forms. A copy of the initialed and dated computer printed report will be sent to EG&G in the weekly data package.

At the end of each week, when all field data for a given week has been verified, the RFEDS Field Module will be backed up onto tape. Then, an RFEDS export file on diskette will be created using the RFEDS file transfer option. This diskette will be labeled with the subcontractor company name, date of diskette, and the type of data it contains (e.g., well data, soil boring data, etc.). A RFEDS tracking data file on diskette containing verified field tracking data will also be created and labeled as described above. Use only 3½-inch double-sided, high-density diskettes for all diskettes to be sent to EG&G. Delivery of the diskettes will be on a schedule determined by EG&G.

The original data diskette containing the data base data, the tracking data diskette, and the diskette chain of custody, along with all of the original data base reports and the field data transmittal forms

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will be hand-delivered to the designated EG&G representative. A duplicate copy of these diskettes will be made at this time and filed with the original field data forms and the copies of the verified, initialed, and dated reports. A paper copy of the tracking data will be kept on file for quick reference.

The original data base data will remain on the hard disk in an archived form until removed by EG&G. This is the primary reason for copying the data to a diskette at the same time as the diskette is prepared for EG&G. The computer will be backed up weekly, using a tape drive just before the data disks are produced for EG&G. EG&G will determine the weekly delivery date. At least four weeks of backups will be maintained at any one time, and the tapes will be stored in a locked storage area.

### 5.8 SECURITY

The computers will be kept in a secure location and locked when not in use. The data base itself will utilize a password security system. The passwords required will be known only to the personnel who enter the data onsite, the onsite manager, and a representative of EG&G.

### 6.0 DOCUMENTATION

A permanent record of the implementation of this SOP will be kept by documenting field observations and data on field data forms, and verification observations in a data verification notebook. Field observations and data will be recorded with black waterproof ink on field data forms. Data verification observations will be recorded with black waterproof ink in a bound observation notebook with consecutively numbered pages. Documentation of the verification of the data base and the tracking data will be recorded and include the following data:

- Date of verification
- Initials of the verifier
- Date delivered to EG&G

## FIELD DATA MANAGEMENT

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The task manager will be responsible for ensuring that this documentation is completed

See Section 7 0, Forms for examples of the data forms

### 7 0 FORMS

The following data management forms are the current RFEDS requested field data as of February 1991. Data are collected in compliance with the related sampling SOP. Each SOP will include a copy of the appropriate data forms used during sampling.

The current RFEDS data base does not address all the parameters which are collected in the field. These additional parameters are in the field data sampling forms included in the cross-referenced SOPs.

Included within this SOP are the following RFEDS forms:

- Form FO 14A, Field Data Transmittal Form (RFEDS)
- Form FO 14B, Ground Water Sample Results Form
- Form FO 14C, Surface Soil Sample Form
- Form FO 14D, Sediment Sample Form
- Form FO 14E, Borehole Sample Form
- Form FO 14F, Surface Water Form
- Form FO 14G, Well Installation Form
- Form FO14.H, Lithology, Chemical Borehole and Gradational Grain Size Forms
- Form FO14.I, Pit and Trench Form
- Form FO 14J, Biological Sampling Form
- Form FO 14K, Sample Tracking Form

## FIELD DATA MANAGEMENT

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- Form FO.14L, Groundwater Level Measurement Form
- Form FO 14M, Air Flow Tables Form

Forms FO 14B through M are "hard" copies (paper prints) of the computer screen accessed when entering data to RFEDS. The Sample Collection Form must be completed (entered) in conjunction with Forms B, C, D, E, and F.

# ROCKY FLATS ENVIRONMENTAL DATABASE SYSTEM (RFEDS) FIELD DATA TRANSMITTAL FORM

DATA FOR THE WEEK OF \_\_\_\_\_ SUBCONTRACTOR \_\_\_\_\_

### TYPE OF DATA

GROUNDWATER SAMPLING	<input type="checkbox"/>	WELL INSTALLATION/GEOLOGIC LOGGING	<input type="checkbox"/>
SURFACE SOIL SAMPLING	<input type="checkbox"/>	BIOLOGICAL SAMPLING	<input type="checkbox"/>
SEDIMENT SAMPLING	<input type="checkbox"/>	SAMPLE TRACKING	<input type="checkbox"/>
BOREHOLE SAMPLING	<input type="checkbox"/>	GW LEVEL MEASUREMENT	<input type="checkbox"/>
SURFACE WATER SAMPLING	<input type="checkbox"/>	AIR FLOW TABLES	<input type="checkbox"/>
		PITS AND TRENCHING	

TOTAL NUMBER OF FORMS \_\_\_\_\_

FIELD DATA VALIDATION AND VERIFICATION BY \_\_\_\_\_ DATE \_\_\_\_\_

## COMPUTER ENTRY AND VERIFICATION

DATA ENTERED BY \_\_\_\_\_ DATE \_\_\_\_\_  
 VERIFICATION BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CORRECTIONS BY \_\_\_\_\_ DATE \_\_\_\_\_  
 DISKETTE PREPARED BY \_\_\_\_\_ DATE \_\_\_\_\_

### DATA AND DISKETTE DELIVERY TO EG&G

RECEIVED BY \_\_\_\_\_ DATE \_\_\_\_\_

## FIELD DATA DELIVERABLE

[illegible]

ENTER SAMPLE NUMBER

Num

Sample Collection Form

Project Number		Type	
Project Name			
Sample Number			
Station Code		Dry	(Y/N)
Collection Date	/ /	Quarter	
Time			
Purpose			
QC Type			
QC Partner			
Volume Collected		Units	
Collection Technique			
Sample Team	Leader		
	Member		
	Member		
	Prepared By		
Press J for Jump to Tracking			
N for Next, D for Done, T to Edit This Form			(N/D/T)

Num

Ground Water Sample Results Form

Project Number	Name		
Sample Number	Well Number		
Purge Volume	Units		
Purge Rate	Units		
Purging Method	Depth to Water	FT	
Field Analytical Parameters			
Specific Conductance	US/CM	pH	
Conductivity	Units	Eh	MV
Conductivity Temperature		Color	
Sample Temperature		Odor	
Dissolved Oxygen	MG/L	Turbidity	NTU
Headspace Reading		Nitrate	MG/L
Total Alkalinity			
Comments			
Press N for Next, P for Previous, D for Done, T to Edit This Form			(N/P/D/T)

ENTER SAMPLE NUMBER

Num  
Sample Collection Form

Project Number			
Project Name			
Sample Number		Type	
Station Code		Dry	(Y/N)
Collection Date	/ /	Quarter	
Time			
Purpose			
QC Type			
QC Partner			
Volume Collected		Units	
Collection Technique			
Sample Team	Leader		
	Member		
	Member		
	Prepared By		
Press J for Jump to Tracking			
N for Next, D for Done, T to Edit This Form (N/D/T)			

Num  
Surface Soil Sample Form

Project Number	Name
Sample Number	
Depth of Take	Start
	in
	in
	in
	in
Headspace Reading	
Comments	
Press N for Next, P for Previous, D for Done, T to Edit This Form (N/P/D/T)	



ENTER SAMPLE NUMBER

Num

## Sample Collection Form

Project Number			
Project Name			
Sample Number		Type	
Station Code		Dry	(Y/N)
Collection Date	/ /	Quarter	
Time			
Purpose			
QC Type			
QC Partner			
Volume Collected		Units	
Collection Technique			
Sample Team	Leader		
	Member		
	Member		
	Prepared By		
Press J for Jump to Tracking			
N for Next, D for Done, T to Edit This Form (N/D/T)			

Num

## Sediment Sample Form

Project Number	Name
Sample Number	
Depth of Water	FT
Depth of Take	INCHES
Comments	
Press N for Next, P for Previous, D for Done, T to Edit This Form (N/P/D/T)	

U S DEPARTMENT OF ENERGY ROCKY FLATS PLANT

FORM FO.14E

ENTER SAMPLE NUMBER

Num  
Sample Collection Form

Project Number			
Project Name			
Sample Number			Type
Station Code			Dry (Y/N)
Collection Date	/ /	Quarter	
Time			
Purpose			
QC Type			
QC Partner			
Volume Collected			Units
Collection Technique			
Sample Team		Leader	
		Member	
		Member	
		Prepared By	
Press J for Jump to Tracking			
N for Next, D for Done, T to Edit This Form (N/D/T)			

Borehole Sample Form

Project Number		Name																																																																											
Sample Number																																																																													
Boring																																																																													
Rad Type	OVM Type		Equipment Number																																																																										
<table border="1"> <thead> <tr> <th colspan="2">Start</th> <th colspan="2">End</th> <th colspan="2">Depth of Take</th> <th colspan="2">Recovery</th> <th colspan="2">OVM</th> <th colspan="2">RAD</th> <th colspan="2">USCS Soil/Rock Type</th> </tr> </thead> <tbody> <tr> <td>FT</td> <td></td> <td>FT</td> <td></td> <td></td> <td></td> <td>ppm</td> <td></td> <td>CPM</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FT</td> <td></td> <td>FT</td> <td></td> <td></td> <td></td> <td>ppm</td> <td></td> <td>CPM</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FT</td> <td></td> <td>FT</td> <td></td> <td></td> <td></td> <td>ppm</td> <td></td> <td>CPM</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FT</td> <td></td> <td>FT</td> <td></td> <td></td> <td></td> <td>ppm</td> <td></td> <td>CPM</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FT</td> <td></td> <td>FT</td> <td></td> <td></td> <td></td> <td>ppm</td> <td></td> <td>CPM</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Start		End		Depth of Take		Recovery		OVM		RAD		USCS Soil/Rock Type		FT		FT				ppm		CPM				FT		FT				ppm		CPM				FT		FT				ppm		CPM				FT		FT				ppm		CPM				FT		FT				ppm		CPM			
Start		End		Depth of Take		Recovery		OVM		RAD		USCS Soil/Rock Type																																																																	
FT		FT				ppm		CPM																																																																					
FT		FT				ppm		CPM																																																																					
FT		FT				ppm		CPM																																																																					
FT		FT				ppm		CPM																																																																					
FT		FT				ppm		CPM																																																																					
Gen OVM .		Gen RAD																																																																											
Comments .																																																																													
Press N for Next, P for Previous, D for Done, T for This form (N/P/D/T)																																																																													

ENTER SAMPLE NUMBER

Num

Sample Collection Form

Project Number			
Project Name			
Sample Number		Type	
Station Code		Dry	(Y/N)
Collection Date	/ /	Quarter	
Time			
Purpose			
QC Type			
QC Partner			
Volume Collected		Units	
Collection Technique			
Sample Team Leader			
Member			
Member			
Prepared By			
Press J for Jump to Tracking			
N for Next, D for Done, T to Edit This Form (N/D/T)			

Num

ENTER DEPTH

Surface Water Form

Project Number		Name	
Sample Number		Depth	
Water Body type			
Flow Rate		Flow Rate Method	
Stream Width		Total Depth	
Field Analytical Parameters			
Air Temperature		Units	
Salinity		Temperature	
Saturation		eH	
Dissolved Oxygen		pH	
Chlorine		End Point #1	
Total Alkalinity		End Point #2	
Specific Conductance		End Point #3	
Comments			
Press M to Add/change to Another Depth, N for Next			
P for Previous, D for Done, T to Edit This Form (M/N/P/D/T)			

**SCREENS 1, 2 and 3**

**RFEDS**

## Well Installation Form

Well Number Old Well No		Project Number		EMAD
Area		North or Y	East or X.	
Purpose				
Formation		Well Status.		
Contractor		Drilling Method.		
Geologist		Locator		
Date Drilled.		Ground Elev	ft.	
Total Depth	ft	Stick Up	ft	
Depth to Bedrock	ft	Completed Depth.	ft.	
Casing Diameter	in.	Borehole Diam	in.	
Monitoring Interval	ft. to	ft		
Initial Water Level	ft	Date		
Completed Water Level.	ft	Date		
Item	From	To	I.D.	Type
Surface Seal	ft		ft	
Protective Casing:	ft		ft	in
Surface Casing:	ft		ft	in.
Secondary Casing:	ft		ft	in
Centralizer	ft		ft	in.
Bentonite Seal.	ft		ft	in
Filter Pack:				
Volume	cu ft			
Screen	ft		ft	in.
Slot Size	in			
Sump	ft		ft	in.
Backfill Seal	ft		ft	
Backfill	ft		ft	
Volume	cu. ft			
Well Number		Project Number		
*Remarks				
DO NOT ENTER LITHOLOGY DESCRIPTIONS HERE!				

SCREEN 1  
Num  
Lithology Sheet

Well Core Box Number	Interval
Lithology Word Comments	Inter-Bed Word
Press D for done, N for Next, T to Edit This Form (D/N/T)	

SCREEN 2  
Num  
Chemical Borehole Sheet

Well Number	Sample Number
Interval 0 00 FT to 0 00 FT	
Press D for done, N for Next, T to Edit This Form (D/N/T)	

SCREEN 3  
Num  
Gradational Grain Size Sheet

Well Number	Sample Number										
Interval 0.00 FT to 0.00 FT											
<table><tr><td>% Gravel</td><td>% Sand</td><td>% Sieve</td><td>% Silt</td><td>% Clay</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr></table>		% Gravel	% Sand	% Sieve	% Silt	% Clay	0	0	0	0	0
% Gravel	% Sand	% Sieve	% Silt	% Clay							
0	0	0	0	0							
Press D for done, N for Next, T to Edit This Form (D/N/T)											

ENTER SAMPLE NUMBER

Num

## Sample Collection Form

Project Number			
Project Name			
Sample Number		Type	
Station Code		Dry	(Y/N)
Collection Date	/ /	Quarter	
Time			
Purpose			
QC Type			
QC Partner			
Volume Collected		Units	
Collection Technique			
Sample Team    Leader			
Member			
Member			
Prepared By			
Press J for Jump to Tracking			
N for Next, D for Done, T to Edit This Form                      (N/D/T)			

## Pit and Trench Form

Sample Number    New		Project Number    EMAD	
Station Code			
Total Length	FT	Section	
Comments			
Start	End	Length	Rad    OVM    USCS Horizon
FT	FT	FT	CPM    PPM
FT	FT	FT	CPM    PPM
FT	FT	FT	CPM    PPM
FT	FT	FT	CPM    PPM
FT	FT	FT	CPM    PPM
Gen OVM		Gen RAD	
Press N for Next, P for Previous, D for Done, T to Edit This Form    (N/P/D/T)			

## Biological Sampling Data

Project Number Sample Number		Name Sample Type	
Location Code	Area	Time	
Location Description	Notebook #	Page #	
Accuracy ±	FT Grid X,Y	0	
Sample Sub-Type		Aquatic/Terrestrial	
QA/QC Code	Lab ID	:	
Number of Containers	Container Volume	.	
Type of Containers	Analytical Suite	.	
Tissue Type	Quarter	.	
Chain of Custody No	Crew Leader	.	
Sample Purpose	Sample Weight	.	
Comments			
Initial Sample Date	Final Sample Date	Ship Date	Sample StorageGen
/ /	/ /	/ /	
D for Done, T for This form		(D/T)	

ENTER BOTTLE ID

Num Caps

## Sample Tracking Form

Project Number	Name EMAD	Sample Type
Sample Number		Location Code
Bottle ID		
Area		QA/QC Code
Lab ID		Number of Bottles
Volume of Bottles		Shipping Manager
Parameter	VOA-CLP	
Chain of Custody		
Comments		
<u>Init Date</u>	<u>Final Date</u>	<u>Ship Date</u>
/ /	/ /	/ /
(Press M to Add/Change Another Bottle ID, N for Next, R for Remove P for Previous, D for Done, T to Edit This Form) (M/N/P/D/T)		



## Ground Water Level Measurement Form

WELL NO

Project Number	EMAD	Name
Well Number		
Date Measured	/ /	
Depth to Water	FT	
Measured by		
Comments		

Press M to Add/Change Another Well and Date, R to Remove this Level,  
D for Done, T to Edit This Form (M/T/D)

## RADIOACTIVE AMBIENT AIR

## AIR FLOW TABLE

Project Number Sample Number	Project Name
Temperature	New-Filter Time
Air Flow	Pressure
Field Person	Meter Reading
	Notes
Check-Filter Date	Time
Temperature	Pressure
Airflow	Meter Reading
Field Person	Notes
Change-Filter Date	Time
Temperature	Pressure
Airflow	Meter Reading
Field Person	Notes

F1 for help - F10 to commit (save) - F6 to clear block

F7 to query (search) - shift F6 to delete - shift F10 to ESC to exit/cancel

Char Mode Replace Page 1

**APPENDIX FO.14A**

**APPENDIX FO.14A**  
**RFEDS SAMPLE NOMENCLATURE CONVENTION**

**A.1 RFEDS SAMPLE NUMBERS AND TYPES**

The EG&G sample numbers consist of a sample prefix that relates to the type of sample that was collected, a 5 digit number and a two character code indicating the company that collected the sample. In addition, in the case of sampling done for the Operational Units, the company code is followed by a U and the number of the operational unit. No slashes, dashes or spaces are allowed and the sample number entered into the field module must exactly match the sample number on the chain of custody.

**A.2 ADDITIONS TO THE SAMPLE NUMBER**

For Matrix Spikes and Matrix Spike Duplicates (MS/MSD), add MS or MSD to the end of the sample number. When labs require that lab replicates be taken in the field, these need to be identified by the letters LR added to the end of the sample number. Do not use suffixes to indicate duplicates, rinsates, etc.

<b>SAMPLE PREFIX</b>		<b>SAMPLE TYPE</b>
BI	Biological Samples	BI
BH	Borehole Samples - drilling samples	SB
GW	Groundwater Samples	GW
FT	Field Treatability Samples	FT
NP	NPDES Program Samples For Ponds	SW
SD	Surface Water Sediment Samples	SD
SS	Soil Samples	SS
SW	Surface Water Samples	SW
PW	Special Water Samples	PW
DR	Drum samples	DR
DW	Decon Pad Water Samples	DW
DS	Decon Pad Sediment Samples	DS

<u>SAMPLE SUFFIXES</u>	<u>EXPLANATION</u>
WC	Woodward-Clyde
ST	Stoller
EB	Ebasco
IT	International Technology
AS	ASI
RF	Rocky Flats

#### **A.2.1 ADDITIONAL SAMPLE SUFFIXES FOR OPERATIONAL UNITS ONLY**

<u>SUFFIX</u>	<u>AREA</u>	<u>SUFFIX</u>	<u>AREA</u>	<u>SUFFIX</u>	<u>AREA</u>
<u>U1</u>	<u>OU1</u>	<u>U6</u>	<u>OU6</u>	<u>U11</u>	<u>OU11</u>
<u>U2</u>	<u>OU2</u>	<u>U7</u>	<u>OU7</u>	<u>U12</u>	<u>OU12</u>
<u>U3</u>	<u>OU3</u>	<u>U8</u>	<u>OU8</u>	<u>U13</u>	<u>OU13</u>
<u>U4</u>	<u>OU4</u>	<u>U9</u>	<u>OU9</u>	<u>U14</u>	<u>OU14</u>
<u>U5</u>	<u>OU5</u>	<u>U10</u>	<u>OU10</u>	<u>U15</u>	<u>OU15</u>

#### **EXAMPLE SAMPLE NUMBERS**

SW12345WC     Surface water sample number 12345 collected by Woodward Clyde

BHI2345EBU1   Borehole sample number 12345 collected by Ebasco as  
part of the OU1 investigation

SSI2345ST     Soil sample number 12345 collected by Stoller

DW12345IT     Decon Pad Water Sample 12345 by IT

### **A.3 LOCATION CODES**

#### **A.3.1 BOREHOLES**

00191     First three digits are the assigned numbers for a given Operational Unit, last two digits  
are the year the borehole was drilled   No spaces, slashes or dashes are allowed

### **A.3.2 SURFACE WATER STATIONS**

**SW001** For every station except the ponds, the first two characters are always SW to indicate a surface water station. The last three numbers represent the station number. No spaces, slashes or dashes are allowed.

**A4** Location codes for the pond water samples start with the pond designation followed by an abbreviation of the site where sample was taken. For example A4BG was taken at Pond A4 between the GAC filters. Those people taking pond samples will need to get an expanded list of pond sample locations from EMAD.

### **A.3.3 DECON PAD WATER TANKS**

**DW** Location code for composite decon water tank samples

**DW1** Location code for Decon Pad Tank 1

**DW2** Location code for Decon Pad Tank 2

**DW3** Location code for Ocean Pad Tank 3

**DW4** Location code for Decon Pad Tank 4

**DW5** Location code for Decon Pad Tank 5

### **A.3.4 SEDIMENT STATIONS**

**SED001** Every sediment station has a prefix of SED followed by the number of the station. No spaces, slashes or dashes are allowed.

### **A.3.5 SOIL SAMPLES**

No nomenclature system has yet been developed for the soil sampling location codes.

### **A.3.6 BIOLOGICAL SAMPLES**

All biological locations will begin with the letters BI followed by 3 digits. Ebasco will have locations B1001 through B1200, Stoller will have B1201 through B1400. An example is shown below.

BI123 Biological Location 123

#### A.3.6 FIELD TREATABILITY STUDIES

FT001 All sites will have a prefix of FT followed by the number of the site No spaces, slashes or dashes are allowed

#### A.4 FIELD QA/QC CODES

<u>CODE</u>	<u>EXPLANATION</u>
RNS	Equipment Rinsate
REAL	Actual Sample (QC Partner)
DUP	Field Duplicate
TB	Trip Blank
FB	Field Blank
MS	Matrix Spike
MSD	Matrix Spike Duplicate
LR	Lab Replicate

#### A.4.1 BOTTLE ID CODES

The following is a list of the bottle codes and the associated EPA analysis methods These codes will be used for input into the RFEDS field tracking module

##### METHOD CODES

CODE	DESCRIPTION		GRAASP
V	CLP VOA PACKAGE	1.1	VOACLP
VAR	VOA EPA METHOD 624 REGULATED LIST	1.2	VOA624
VAC	VOA EPA METHOD 624 COMPLETE LIST	1.3	VOA624
VBR	VOA EPA SW-846 METHOD 8240 REG LIST	1.4	VOA8240
VBC	VOA EPA SW-846 METHOD 8240 COMP	1.5	VOA8240

VCR	VOA EPA METHOD 524 2 REGULATED LIST	1 6	VOA524 2
VCC	VGA EPA METHOD 524 4 COMPLETE LIST	1 7	VOA524 2
VDR	VOA EPA METHOD 502 2 REGULATED LIST	1 8	VOA502 2
VDC	VOA EPA METHOD 502 2 COMPLETE LIST	1 9	VOA502 2
VER	VOA EPA METHOD 601 REGULATED LIST	1 10	VOA601
VEC	VOA EPA METHOD 601 COMPLETE LIST	1 11	VOA601
VF	VOA EPA METHOD TO-14	1 12	VOATO-14
<b>B</b>	<b>SEMI-VOLS EPA CLP METHOD</b>	<b>1.13</b>	<b>BNACLP</b>
BAR	SEMI-VOLS EPA METHOD 625 REGULATED LIST	1 14	BNA625
BAC	SEMI-VOLS EPA METHOD 625 COMPLETE LIST	1 15	BNA625
BB	SEMI-VOLS EPA METHOD 625 BASE/NEUTRAL E	1 16	BNA625B
BCR	SEMI-VOLS EPA METHOD 1625 REGULATED L	1 17	BNA1625
BCC	SEMI-VOLS EPA METHOD 1625 COMPLETE L	1 18	BNA1625
BDR	SEMI-VOLS EPA METHOD 8270 REGULATED L	1 19	BNA8270
BDC	SEMI-VOLS EPA METHOD 8270 COMPLETE L	1.20	BNA8270
BER	SEMI-VOLS EPA METHOD 525 REGULATED L	1.21	BNA525
BEC	SEMI-VOLS EPA METHOD 525 COMPLETE L	1.22	BNA525
<b>P</b>	<b>PESTICIDES/PCB CLP METHOD</b>	<b>1.23</b>	<b>PESTCLP</b>
<b>P</b>	<b>PCB CLP METHOD</b>	<b>1.23</b>	<b>PESTCLP</b>
PAR	ORGANOCHLORINE PEST/PCB METHOD 608 REG	1.24	PEST608
PAC	ORGANOCHLORINE PEST/PCB METHOD	1.25	PEST608



608 COM

PBR	ORGANOCHLORINE PEST/PCB METHOD 505 REG	1.26	PEST505
PBC	ORGANOCHLORINE PEST/PCB METHOD 505 COM	1.27	PEST505
PCR	ORGANOCHLORINE PEST/PCB METHOD 8080 REG	1.28	PEST8080
FCC	ORGANOCHLORINE PEST/PCB METHOD 8080 COM	1.29	PEST8080
PD	PCBS ONLY, BY EPA METHOD 8080 COMPLETE	1.30	PCB8080C
PE	CHLORINATED HERBICIDES METHOD 615	1.31	CLHERB615
PF	ORGANOCHLORINE HERBICIDES METHOD	1.32	HERB8150
PGR	CHLORINATED HERBICIDES METHOD 508 REG	1.33	HERB508
PGC	CHLORINATED HERBICIDES METHOD 508 COM	1.34	HERB508
PH	TRIAZINE PESTICIDES METHOD 619	1.35	TRIPES619
PI	TRIAZINE PESTICIDES METHOD 507	1.36	TRIPES507
PJ	PEST/PCB/HERB BY LIQUID CHROMATOGRAPHY MASS SPECTROMETRY DETECTION	1.37	PESTMS
PK	PEST/PCB/HERB BY LIQUID CHROMATOGRAPHY FLUORESCENCE DETECTION	1.38	PESTLC
PL	NITROSO-AMINES EPA METHOD 607	1.39	NAPEST607
PM	POLYNUCLEAR AROMATIC HYDROCARBONS METHOD 610	1.40	PHPEST610
PN	DIOXIN (2,3,7,8-TCDD) EPA METH 613	1.41	DPEST613
M	METALS (STANDARD & ADDITIONAL) CLP		METCLP
M*	METALS (STANDARD & ADD.) CLP DISSOLVED		DMETCLP
MA	METALS STANDARD CLP	1.42	SMETCLP
MA*	METALS STANDARD CLP DISSOLVED	1.42	DSMETCLP

MB	ADD CLP METALS (CS,CR,LI,MO,SI,SR,SN)	1 43	METADD	
MB*	ADD CLP METALS (CS,CR,LI,MO,SI,SR,SN)	1 43	DMETADD	
MC	METALS BY ATOMIC ADSORPTION		METCLPAA	
MC*	METALS BY ATOMIC ADSORPTION DISSOLVED		DMETCLPAA	
W	STANDARD WATER QUALITY SUITE	1 44	WQPL	
WA	TSS, TDS, CL, F, SO4, CO3, HCO3	1 44	WQPL	
WBA	AMMONIA (NH4)	1 44	WQPL	
WBB	TOTAL PHOSPHOROUS	1 44	WQPL	
WBC	NITRATE/NITRITE as N (NO3/NO2 as N)	1 44	WQPL	
WBD	TOTAL PHOSPHORUS & AMMONIA (NH4)	1 44	WQPL	
WBE	NO3/NO2 as N, TOTAL PHOSPHOROUS & AMMONIA (NH4)	1 44	WQPL	
WBF	NO3/NO2 as N, TOTAL PHOSPHOROUS	1 44	WQPL	
WBG	NO3/NO2 as N, AMMONIA (NH4)	1 44	WQPL	
WBH	NO3, AMMONIA (NH4)	1 44	WQPL	
WC	OIL & GREASE	1 44	WQPL	
WDA	O-PHOSPHATE	1 44	WQPL	
WDB	NO2	1 44	WQPL	
WDC	O-PHOSPHATE, NO2	1 44	WQPL	
WE	CN	1 44	WQPL	
WF	FECAL COLIFORMS, COLIFORM	1.50	WQPL	
WG	COD	1 44	WQPL	
WH	TOC	1 44	WQPL	
WI	DOC	1 44	WQPL	
WJ	SULFIDE AS H2S	1 44	WQPL	

WK	CR6	1 44	WQPL
WL	pH and ALKALINITY	1 44	WQPL
WM	TOTAL KJELDAHL NITROGEN	1 44	WQPL
WN	BOD5, CBOD5	1 49	WQPL
WP	ACUTE TOXICITY TESTING	1.51	WQPL
WQ	BIOTA-OTHER	1.52	WQPL
R	TOTAL RADIONUCLEIDES (RA,RB,RC,RD,RE,RF,RG)		TRADS
R*	DISSOLVED RADIONUCLEIDES (RA,RB,RC,RD,RE,RF,RG)		DRADS
RA	GROSS ALPHA/BETA		TRADS
RA*	GROSS ALPHA/BETA DISSOLVED		DRADS
RB	PU239/240 AM241		TRADS
RB*	PU239/240, AN241 DISSOLVED		DRADS
RC	U233/234, U235, U238		TRADS
RC*	U233/234, U235, U238 DISSOLVED		DRADS
RD	SR89/90, CS137 (+ CS134 WHEN BY GAMMA)		TRADS
RD*	SR89/90, CS137 DISS (+ CS134 WHEN BY GAMMA)		DRADS
RE	RA226, RA228		TRADS
RE*	RA226, RA228 DISSOLVED		DRADS
RF	THORIUM 230/232, CM 244, NP 237		TRADS
RF*	THORIUM 230/232, CM 244, NP 237 DISSOLVED		DRADS
RG	TRITIUM		TRADS
RG*	TRITIUM DISSOLVED		DRADS
RH	RAD SCREEN		RS
RI	RA+RB+RC+RD (TYPICALLY SURFACE WATER)		TRADS
RI*	RA*+RB*+RC*+RD* (TYPICALLY SURFACE WATER)		DRADS

RJ	RA+RB+RC+RD+RG (TYPICALLY SEDIMENTS)		TRADS
RJ*	RA*+RB*+RC*+RD*+RG* (TYPICALLY SEDIMENTS)		DRADS
RK	RA+RC+RD+RE (TYPICALLY GROUNDWATER)		TRADS
RK*	RA*+RC*+RD*+RE* (TYPICALLY GROUNDWATER)		DRADS
RL	RA+RB+RC+RD+RF (TYPICALLY MONTHLY PONDS)		TRADS
RL*	RA*+RB*+RC*+RD*+RF* (TYPICALLY MONTHLY PONDS)		DRADS
RM	RA+RC (TYPICALLY GROUNDWATER)		TRADS
RM*	RA*+RC* (TYPICALLY GROUNDWATER)		DRADS
RN	RB+RC (PU239/240,AN241,U233/234 , U235,U238)		TRADS
RN*	RB*+RC*(PU239/240,AN241,U233/234 , U235,U238)		DRADS
RP	RD+RE (TYPICALLY GROUNDWATER)		TRADS
RP*	RD*+RE* (TYPICALLY GROUNDWATER)		DRADS
RQ	RA+RB+RC+RD+RE (TYPICALLY FOR CORE SAMPLES)		
RQ*	RA*+RB*+RC*+RD* (TYPICALLY FOR CORE SAMPLES DISSOLVED)		
SA	OTHER SPECIAL ANALYSIS METHODS RADS		SPRAD
SB	OTHER SPECIAL ANALYSIS METHODS ORGANIC		SPORG
SC	OTHER SPECIAL ANALYSIS METHODS METALS		SPMET
SD	OTHER SPECIAL ANALYSIS METHODS WATER QUALITY		SPWQL
SE	OTHER SPECIAL ANALYSIS METHODS PEST/PCB		SPPPB
SF	EPA-TCLP GRANULATED ACTIVATED CARBON, FABRIC, PLASTICS REGULATED LIST	1 45	GACR
SG	EPA-TCLP GRANULATED ACTIVATED CARBON FABRIC, PLASTICS	1 46	GACC
SH	RCRA HAZ-WASTE CHAR IGNITABILITY, CORROSIVITY, REACTIVITY, TOXICITY	1 47	ICRT
SI	SEQUENTIAL EXTRACTION OF TRACE ELEMENTS	1 48	OTHER

**A.5 LIST OF RFEDS LAB CODES FOR ANALYTICAL LABS**

<b>LAB</b>	
<b><u>CODE</u></b>	<b><u>LABORATORY</u></b>
123	123 LAB - ROCKY FLATS
881	881 LAB - ROCKY FLATS
ACCU	ACCULABS - WHEATRIDGE
ALPL	ALPHA LABS
ANAL	ANALYTICA
APPL	APPL LABS - FRESNO
ARNL	ARGONNE NATIONAL LABS
CHAD	CHADWICK
ECTC	ECO TEC
ITLC	IT LABS - CERRITOS
ITLK	IT LABS - KNOXVILLE/MIDDLEBROOK
ITLO	IT LABS - OAK RIDGE
ITPA	IT LABS - PITTSBURGH
ITLR	IT LABS - RICHLAND
NETL	NET LABS
RMAL	ROCKY MOUNTAIN ANALYTICAL - WHEAT RIDGE
RFWL	ROY F WESTON ANALYTIC LAB - LIONVILLE
RFWS	ROY F WESTON ANALYTIC LAB - STOCKTON
SAIR	SAIC LABS - ROCKVILLE
SAIS	SAIC LABS - SAN DIEGO
TELI	TELEDYNE ISOTOPES
TMAE	TMA LABS - EBERLINE
TMAN	TMA LABS - NORCAL
TMAS	SKINNER & SHERMAN LABS - S&S
VIST	VISTA LABS - WHEATRIDGE
RFWG	WESTON-GULF COAST ANALYTICAL
SCTK	SCIENCE TECHNOLOGY
ITLSL	IT LAB, ST LOUIS
ITLDL	IT TECH DEV LAB, KNOXVILLE

This is a  
**CONTROLLED DOCUMENT**

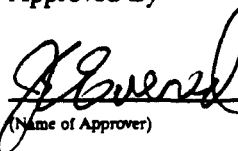
EG&G - ROCKY FLATS PLANT  
ENVIRONMENTAL MANAGEMENT

This is a REF ID: A67011 PHOTOIONIZATION DETECTORS (PIDS) AND FLAME IONIZATION DETECTORS (FIDS)

EG&G ROCKY FLATS PLANT	Manual	5-21000-OPS
EMD MANUAL OPERATION SOP	Procedure No	FO 15, Rev 2
	Page	1 of 7
	Effective Date:	March 1, 1992
Category 2	Organization	Environmental Management

TITLE  
PHOTOIONIZATION DETECTORS  
(PIDS) AND FLAME IONIZATION  
DETECTORS (FIDS)

Approved By

  
(Name of Approver)



MAY 12 1992

(Date)

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REVIEWED FOR CLASSIFICATION/UCNI  
By   
Date  1992

## PHOTOIONIZATION DETECTORS (PIDS) AND FLAME IONIZATION DETECTORS (FIDS)

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### 2 0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures that will be used at Rocky Flats to define the standard operating procedure for the use of flame ionization detectors (FID) and photoionization detectors (PID) in the field. FIDs and PIDs are used to detect and measure volatile organic compounds. An FID or PID is typically calibrated to measure the concentration of a known calibration gas. The instrument can detect other volatile organic compounds, but the concentration indicated will not be accurate. Therefore, these instruments are typically used in the field to screen samples or to monitor the environment for health and safety purposes. They will not be used at Rocky Flats Plant (RFP) for the purpose of obtaining analytical chemistry data.

### 3 0 QUALIFICATIONS

Only qualified personnel will be allowed to perform measurements with FIDs and/or PIDs. The subcontractor's Site Safety Officer will determine who is qualified based on experience and demonstrated competence. Those qualified will use FIDs and PIDs in accordance with this SOP and the manufacturer's written instructions.

### 4 0 REFERENCES

#### 4 1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure:

A Compendium of Superfund Field Operations Methods EPA/540/P-87/001 December 1987

## PHOTOIONIZATION DETECTORS (PIDS) AND FLAME IONIZATION DETECTORS (FIDS)

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Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA Interim Final EPA/540/G-89/004 October 1988

RCRA Facility Investigation Guidance Interim Final EPA May 1989

RCRA Groundwater Monitoring Technical Enforcement Guidance Document EPA OSWER 9950 1 September 1986

Rockwell International Rocky Flats Plant Environmental Restoration Program Quality Assurance/Quality Control Plan January 1989

The Environmental Survey Manual DOE/EH-0053 Volumes 1-4 1987

### 5 0 FID EQUIPMENT AND PROCEDURES

### 5 1 DESCRIPTION AND THEORY

A FID uses ionization as the detection method, in which the ionization is caused by a hydrogen flame, rather than an ultraviolet (UV) light, as in a PID. The flame has sufficient energy to ionize any organic chemical species with an ionization potential (IP) of 15.4 eV or less.

Inside the detector chamber, the sample is exposed to a hydrogen flame, which ionizes the organic vapors. When most organic vapors burn, positively charged carbon-containing ions are produced, which are collected by a negatively charged collecting electrode in the chamber. As the positive ions are collected, a current proportional to the hydrocarbon concentration is generated on the input electrode. This current is measured with a preamplifier that has an output signal proportional to the ionization current.



## PHOTOIONIZATION DETECTORS (PIDS) AND FLAME IONIZATION DETECTORS (FIDS)

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An FID consists of a probe, a pumping system, a particle filter, a hydrogen gas container, a scrubber, a burning chamber, an electrical detection and amplification system, and a read-out device (meter)

FIDs must be calibrated, used, and maintained in accordance with the manufacturer's instructions for each specific instrument. See Appendix FO 15A for an example of some instructions for a specific instrument.

### 6 0 PID EQUIPMENT AND PROCEDURES

#### 6 1 DESCRIPTION AND THEORY

A PID operates on the principle of photoionization. When a photon of UV radiation strikes a chemical compound, it ionizes a molecule of the compound if the radiation is equal to or greater than the ionization potential (IP) of the compound. Because ions are capable of conducting an electrical current, an electron flow can be generated within the instrument.

In a PID, an electrical pump or fan moves the gas being sampled past a UV source. The sample is ionized and ion pair production occurs for each molecule ionized. The free electrons produce a current directly proportional to the number of ions produced. The current is amplified, detected, and displayed on a meter. Chemical species having IPs less than or equal to the lamp rating will generate an appropriate instrument response. Chemical species that have IPs greater than the lamp rating will display a poor instrument response or no response at all.

Employing an 11.7 electron volt (eV) rated lamp would provide a relatively wide range of detectable species, however, that lamp requires frequent replacement. More commonly, a 10.2-eV lamp is

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used. A 10.2-eV lamp offers relatively high radiation levels without frequent lamp replacement and will detect many species, with the notable exception of chlorinated aliphatics.

PIDs must be used, calibrated, and maintained in accordance with the manufacturer's instructions for each specific instrument. The PID consists of a probe, readout assembly, and a battery charger. The probe contains the sensing and amplifying circuitry, the readout assembly contains the meter controls, and the power supply is a rechargeable battery. There are numerous models of PIDs available (see Appendix FO.15B for example information on one specific instrument).

### 7.0 DECONTAMINATION

PIDs and FIDs will be placed in plastic bags with the sensing probe protruding through the bag prior to use in the field to reduce the potential for gross contamination. The bag will be fastened in such a way as to allow viewing of the meter readout and access to instrument controls. Bags should be discarded during decontamination at the end of the workshift. The external surfaces of the PIDs and FIDs should be wiped with Kim-wipe or a similar material prior to its return to the equipment manager. Equipment should be decontaminated in accordance with SOP FO.3, General Equipment Decontamination.

### 8.0 QUALITY ASSURANCE/QUALITY CONTROL

Daily calibration and operational checks are required to ensure that the instrument is functioning properly. Manufacturer's calibration instructions must be accomplished prior to daily use, and calibration must be confirmed at the end of each day.

## PHOTOIONIZATION DETECTORS (PIDS) AND FLAME IONIZATION DETECTORS (FIDS)

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PIDs and FIDs will be checked periodically during use to ensure that they are responding to contaminants. A Magic Marker® used as a source of volatile gas works well to demonstrate that the instrument is responding.

The manufacturer's operating manual will be used for the operation, calibration, maintenance, and care of FIDs and PIDs. The manual will be present on site at all times.

### 9.0 DOCUMENTATION

Use of PIDs and FIDs will be in accordance with the Health and Safety Plan or SOPs requiring its use. Observations or calculations will be documented by personnel in a bound, water-proof field notebook. Observations that need to be documented will be entered into the site manager's daily logbook. Entries will be signed and dated by field personnel making the entries. Form FO 15A, Calibration Record, will be used to document daily calibrations. The Calibration Record asks for the following information:

- **Date/Time**
- **Initial Response** - Initial Response is the first meter reading obtained with calibration gas to either adjust instrument or note how far off the instrument is drifting depending on whether an HNu or Thermal Environmental is used.
- **Alarm Setting**
- **Calibration Sequence Initiated** - Cal sequence is a feature specific to the Thermal Environmental System Model 580B. Calibration must be done twice on

**PHOTOIONIZATION DETECTORS (PIDS) AND FLAME IONIZATION DETECTORS (FIDS)**

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Model 580B in order to store in memory If only done once, the calibration is not stored in memory

- Results
- Calibrator's Name

## CALIBRATION RECORD

INSTRUMENT \_\_\_\_\_

MODEL \_\_\_\_\_

CALIBRATION GAS USED \_\_\_\_\_

SUBCONTRACTOR \_\_\_\_\_

INSTRUMENT \_\_\_\_\_ SERIAL NUMBER: \_\_\_\_\_

Date/Time	Initial Response	Alarm Setting	Cal. Sequence Initiated - Y/N	Results (Pass/Fail)	Calibrators Name

**APPENDIX FO.15A**

**Foxboro OVA-128**

## APPENDIX A

The following appendix provides information pertaining to the Foxboro OVA-128

### A.1 LIMITATIONS

- The OVA will not detect inorganics
- The OVA will detect methane, which is explosive but relatively nontoxic
- Current DOT shipping regulations (Title 49CFR), must be researched before shipping an OVA containing pressurized hydrogen to determine proper shipping name, DOT index number, proper shipping container, packaging, labeling, restrictions, and placarding requirements
- A relative humidity greater than 95 percent will cause inaccurate and unstable responses
- A temperature less than 40°F will cause slow and poor response
- Actual contaminant concentrations are measured relative to the calibration gas used. Therefore, specific contaminants and their quantities cannot easily be identified
- The OVA responds differently to different compounds. Table A-1 is a list, provided by the manufacturer, of the relative sensitivities of the OVA to some common organic compounds. Since the instrument is factory calibrated to methane, all relative responses are given in percent, with methane at 100

TABLE A-1  
RELATIVE RESPONSE SENSITIVITY FOR OVA

Chemical Compound	Instrument Indication in Percent of Actual Level
<hr/>	
Methane	100
Ethane	90
Propane	64
N-butane	61
N-pentane	100
Ethylene	85
Acetylene	200
Benzene	150
Toluene	120
Acetone	100
Methyl ethyl ketone	80
Methyl isobutyl ketone	100
Methanol	15
Ethanol	25
Isopropyl alcohol	65
Carbon tetrachloride	10
Chloroform	70
Trichloroethylene	72
Vinyl chloride	35
<hr/>	



## **A.2 MAINTENANCE AND CALIBRATION RESPONSIBILITIES**

It is preferable to minimize the number of people responsible for maintenance and calibration of the OVA. These people shall also be responsible for logging the equipment in and out. Documentation of instrument user, dates of use, instrument identification number, maintenance and calibration procedures, and project identification shall be maintained.

## **A.3 SPECIFIC PROCEDURES**

### **A.3.1 Startup Procedures**

- Connect the probe/readout connectors to the side-pack assembly
- Check the battery condition and hydrogen supply
- For measurements taken as methane-equivalent, check that the GAS SELECT dial is set at 300
- Turn the electronics on by moving the INST switch to the ON position, and allow 5 minutes for warm-up
- Set the CALIBRATE switch to X10, use the CALIBRATE knob to set the indicator at 0
- Open the H<sub>2</sub> tank valve and the H<sub>2</sub> supply valve completely. Check that the hydrogen supply gauge reads between 8.0 and 12.0 psig
- Turn the PUMP switch to ON
- Check that the BACKFLUSH and INJECT valves are in the UP position

- To light the flame, depress the igniter switch until a meter deflection is observed. The igniter switch may be depressed for up to 5 seconds. Do not depress the switch for longer than 5 seconds, as it may burn out the igniter coil. If the instrument does not light, allow the instrument to run several minutes and then repeat the ignition attempt.
- Confirm an OVA operational state by using an organic source, such as a Magic Marker®. Any meter deflection will indicate that the OVA is operating.
- Establish a background level in a clean area or by using the charcoal scrubber attachment to the probe (depress the sample inject valve), recording background measurements for reference.
- Set the alarm level, if desired.

#### A 3.2 Shutdown Procedure

- Close the H<sub>2</sub> supply valve and H<sub>2</sub> tank valve (do not overtighten the valves).
- Turn the INST switch to OFF.
- Wait until the H<sub>2</sub> supply gauge indicates that the system is purged of H<sub>2</sub> (approximately 10 seconds), then switch off the pump.
- Put the instrument on an electrical charger at completion of day's activities.

### **A.3.3 Maintenance and Calibration Schedule**

<u>Function</u>	<u>Frequency</u>
Check particle filters	Weekly or as needed
Check quad rings	Monthly or as needed
Clean burner chamber	Monthly or as needed
Check secondary calibration	Prior to project startup
Check primary calibration	Monthly, or if secondary calibration is off by more than $\pm 10$ percent
Check pumping system	Before project startup
Replace charcoal in scrubber attachment	120 hours of use, or when background readings in a clean environment are higher with the inject valve down than with the inject valve up
Factory service	At least annually

Note Instruments that are not in service for extended periods of time need not meet the above schedule. However, they must be given a complete checkout before their use, addressing the maintenance items listed above.

### **A.3.4 Calibration Procedures**

#### **A.3.4.1 Primary Calibration**

- Remove the instrument components from the instrument shell
- Turn on ELECTRONICS and ZERO INSTRUMENT on the X10 scale. Set the gas-select dial to 300.

- Turn on PUMP and HYDROGEN Ignite the flame Go to SURVEY MODE
- Introduce a methane standard near 100 parts per million (ppm)
- Adjust R-32 Trimpot on the circuit board to make the meter read to standard
- Turn off the hydrogen flame, and adjust the meter needle to read 40 ppm (calibrate @ X10) using the calibration adjust knob
- Switch to X100 scale The meter should indicate 0.4 on the 1 to 10 meter markings ( $0.4 \times 100 = 40$  ppm) If the reading is off, adjust with R33 Trimpot
- Return to X100 scale and adjust the needle to 40 ppm with calibration, adjust the knob, if necessary
- At the X10 scale, adjust the meter to read 0.4 on the 1-to-10 meter markings using the calibration adjust Switch to the X1 scale The meter should read 4 ppm If the reading is off, adjust using the R31 Trimpot

#### A 3 4 2 Secondary Calibration

- Fill an air sampling bag with 100 ppm (certified) methane calibration gas
- Connect the outlet of the air-sampling bag to the air-sampling line of the OVA
- Record the reading obtained from the meter on the calibration record

#### A 3 4 3 Documentation

All field calibrations will be documented on the calibration record form, Attachment 1 15A (see Section II)

- Instrument calibrated (I D or serial number)
- Date of calibration
- Results of the calibration
- Identification of person who calibrated the instrument

- Identification of person who calibrated the instrument
- Identification of the calibration gas (source, type, concentration, lot number)

#### A 3 4 4 Pump System Checkout

- With the pump on, hold the unit upright and observe the flow gauge
- See if the ball level is significantly below a reading of 2, if so, flow is inadequate
- Check connections at the sample hose
- Clean or replace particle filters if the flow is impaired or if it is time for scheduled service
- Reassemble and retest flow
- If the flow is still inadequate, replace the pump diaphragm and valves
- If flow is normal, plug the air intake The pump should slow and stop
- If there is no noticeable change in the pump, tighten the fittings and retest
- If there is still no change, replace the pump diaphragm and valves
- Document this function in the maintenance records

#### A 3 4 5 Burner Chamber Cleaning

- Remove the plastic exhaust port cover
- Unscrew the exhaust port
- Use a wire brush to clean the burner tip and electrode Use a wooden stick to clean the Teflon surfaces
- Brush the inside of the exhaust port
- Blow out the chamber with a gentle air flow
- Reassemble and test the unit
- Document this function in the maintenance records

#### A 3 4 6 Quad Ring Service

- Remove OVA instruments from their protective shell
- Remove the clip ring from the bottom of the valve.
- Unscrew the nut from the top of the valve

- Gently pull the valve shaft upward and free it of its housing
- Examine the rings for signs of damage, replace them as necessary
- Lightly grease the rings with silicone grease
- Reassemble the valve, do not pinch the rings during shaft insertion
- Document this function in the maintenance records

#### A 3 4 7 Troubleshooting

<u>Indication</u>	<u>Possible Cause</u>
High background reading (More than 10 ppm)	Contaminated hydrogen Contaminated sample line
Continual flameout	Hydrogen leak Dirty burner chamber Dirty air filter
Low air flow	Dirty air filter Pump malfunction Line obstruction
Flame will not light	Low battery Igniter broken Hydrogen leak Dirty burner chamber Air flow restricted
No power to pump	Low battery Short circuit
Hydrogen leak	Leak in regulator (instrument not in use) Leak in valves

#### A 3 4 8 Hydrogen Recharging

- High-grade hydrogen (99 999 percent) is required Maximum pressure the instrument can handle is 2,300 psig
- Connect the fill hose to the REFILL FITTING on the side pack assembly with the FILL/BLEED valve in the OFF position
- Open the H<sub>2</sub> SUPPLY BOTTLE valve
- Place the FILL/BLEED valve on the fill hose in the BLEED position MOMENTARILY to purge any air out of the system

- Open the instrument TANK valve
- Open the REFILL valve on the instrument

Place the FILL/BLEED valve in the FILL position until the instrument pressure gauge equalizes with the H<sub>2</sub> SUPPLY BOTTLE pressure gauge

- Shut the REFILL valve, FILL/BLEED valve, and H<sub>2</sub> SUPPLY BOTTLE valve, in quick succession
- Turn the FILL/BLEED valve to BLEED until the hose pressure equalizes to atmospheric pressure
- Turn the FILL/BLEED valve to the FILL position, then turn the valve to the BLEED position, then turn to the OFF position
- Close the TANK on the instrument
- Disconnect the FILL HOSE and replace the protective nut on the REFILL FITTING

A 3 4 9

#### Particle Filter Servicing

Filters have been placed at two points in the air sampling line of the OVA to keep particulates from entering the instrument. The first filter is located in the probe assembly, and the second filter (primary filter) is located on the side pack assembly. Cleaning procedures are as follows:

- Detach the probe assembly from the readout
- Disassemble the probe (unscrew the components)
- Clean the particle filter located within the probe by blowing air through the filter
- Reassemble the probe
- Gain access to the primary filter, located behind the sample inlet connector on the side pack assembly, by removing the sample inlet connector with a thin-walled, 7/16-inch socket wrench. Remove the filter, and clean it as above.

- Reassemble the sample inlet fitting and filter to the side pack assembly
- Check the sample flowrate

**Note:** The manufacturer's operating instruction and calibration manual for the specific model of Flame Ionization Detector must be used



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TITLE  
 FIELD RADIOLOGICAL  
 MEASUREMENTS

Approved

  
 (Name of Approver)

MAY 1 8 1992

(Date)

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### 2.0 PURPOSE AND SCOPE

This standard operating procedure (SOP) describes procedures and specifies who will conduct those procedures at the Rocky Flats Plant (RFP) to gather radiological data for monitoring environmental materials, samples, and equipment during field activities conducted under the Environmental Management (EM) Program. In particular, this SOP describes monitoring for the presence of radioisotopes. This SOP does not describe procedures for predicting or assessing personnel exposures to radioisotopes.

### 3.0 RESPONSIBILITIES AND QUALIFICATIONS

Radiological Engineering-approved subcontractor Health and Safety Specialists (HSS) will conduct radiation monitoring activities. All equipment, samples, and personnel will be monitored prior to exiting from the following areas:

- potentially radiologically contaminated areas
- radiological controlled areas designated by the Site Safety Officers (SSO)
- areas that have not been previously characterized by EG&G work area survey and EG&G site characterization

Each subcontractor shall provide an SSO to oversee field monitoring and implement the site-specific Health and Safety Plan. All subcontractor personnel assigned to conduct monitoring activities will have attended either EG&G's 8 hour radiation worker safety course for environmental workers or the three-day radiation worker safety course and will be familiar with the content of this SOP and the applicable manufacturer's instructions for any radiological monitoring instrument that they use.

Subcontractor personnel will conduct radiation monitoring activities within a potentially radiologically contaminated work area to determine the presence or absence of radiological

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contamination during field activities Site-specific monitoring requirements will be identified in the work plan Monitoring will be performed to identify the requirements for handling of environmental materials

#### 4.0 REFERENCES

##### 4.1 SOURCE REFERENCES

The following is a list of references reviewed prior to the writing of this procedure

Nuclear Weapon Accident Response Procedures (NARP) Manual July 2, 1984 The Defense Nuclear Agency

Radiological Operating Instruction 3 1 Performance Of Surface Contamination Surveys August 9, 1989 Rocky Flats Plant Department of Health, Safety, and Environment

##### 4.2 INTERNAL REFERENCES

Related SOPs cross-referenced by this SOP are as follows

- SOP FO 3, General Equipment Decontamination
- SOP FO 4, Heavy Equipment Decontamination
- SOP FO 6, Handling of Personal Protective Equipment
- SOP FO 8, Handling of Drilling Fluids and Cuttings
- SOP FO 10, Receiving, Labeling, And Handling Environmental Materials Containers
- SOP GT 2, Drilling and Sampling Using Hollow Stem Auger Techniques

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### 5.0 EQUIPMENT

The following monitoring devices and supplies or equivalent items will be required for each subcontractor to complete the monitoring activities described by this SOP. The EM Health and Safety Officer will determine if a proposed alternate radiation monitoring device is equivalent to those items specified below.

### 5.1 MONITORING DEVICES

- Ludlum Model 12-1A alpha counter with an air proportional probe
- Ludlum Model 43-10-1 alpha sample counter
- Ludlum Model 2000 scaler/timer
- Bicron Analyst Fidler

### 5.2 SUPPLIES

- Smear papers sized to fit in the Ludlum Model 43-10-1 alpha sample counter tray
- Plastic bags to contain Ludlum Model 12-1A instrument (excluding the detector probe)
- Heat lamp that is clearly labelled to indicate that it will NOT be used to heat foods or drinks and that it is used to dry potentially radioactive smear test papers
- Replacement probe faces for the Ludlum Model 12-1A
- Swipe material such as Kimwipes
- Fold-over envelopes or Glassine envelopes
- Stainless steel scoop

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### 6.0 PROCEDURES

#### 6.1 WORK AREA CHARACTERIZATIONS

Each project area will be characterized by EG&G prior to any field activity. Work area characterizations will be based on the historical background of the work area, EG&G Historical Release Reports and the results of field radiological surveys conducted by Radiological Engineering-approved subcontractor Health and Safety Specialists. Work areas associated with the EM program field operations fall into two characterizations: potentially contaminated and not potentially contaminated. Work areas currently characterized as potentially contaminated include the following:

- Individual Hazardous Substance Sites (IHSS)
- Identified Groundwater Plume Areas
- Americium Zone at OU No. 2
- Protected Areas (PA)

See SOP FO 10, Receiving, Labeling, and Handling of Environmental Materials Containers, for specific work areas currently characterized as potentially contaminated. All other potentially contaminated work areas will be specified in the individual project work plans and/or health and safety plans.

#### 6.2 MONITORING TECHNIQUES AND TASKS

##### 6.2.1 Monitoring Techniques

Radiological Engineering-approved subcontractor Health and Safety Specialists will follow the procedures and apply the contamination limits established for alpha contamination by

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Environmental Management Radiological Guidelines 3.0, Environmental Performance of Surface Contamination Surveys, found in manual EMD3-21000 OPS EMRG Tables I and II

At a minimum, disposable protective gloves will be worn when screening procedures are conducted. When the Ludlum Model 12-1A is being used, it will be placed in a plastic bag, with the exception of the probe, to prevent contamination of the instrument.

The following subsections describe the field monitoring techniques that will be accomplished by the HSS. It is important that the following monitoring techniques be thoroughly understood before the monitoring tasks descriptions provided in Subsection 6.3.2 are reviewed.

### **6.2.1.1 Monitoring With A Ludlum Model 12-1A**

Monitoring with a Ludlum Model 12-1A will normally be done at the work area. It should be noted that alpha radiation will not penetrate the upper layer of a wet surface nor will it travel farther than approximately an inch in air. Therefore, the Ludlum Model 12-1A cannot be used to screen wet surfaces and must be held parallel to and within one quarter inch of the surface being screened.

The Ludlum Model 12-1A count rate meter with an air proportional probe will be used as described in this subsection to monitor environmental materials, samples, equipment, and personnel. Direct surface monitoring with a Ludlum Model 12-1A is a relatively speedy method of determining the presence and extent of potential radiological contamination. However, this method will not distinguish between fixed and removable radiological contamination.

The preferable method of using a Ludlum Model 12-1A to monitor for surface contamination is to make sequential overlapping measurements with a stationary probe. However, slowly sweeping the probe over the surface will also produce accurate results if the Ludlum probe is not moved faster

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than 2 inches per second over the surface being screened and the probe is stopped and held stationary over any indicated counts per minute (cpm) value

Monitoring results greater than 300 disintegrations per minute (dpm)/100cm<sup>2</sup> as indicated by the Ludlum Model 12-1A will be considered indicative of the presence of radiological contamination on the surface. Decontamination procedures are in the SOPs listed in Subsection 4.2

### 6.2.1.2 Monitoring With A Large Area Swipe

Monitoring with large area swipes will normally be accomplished at the work area. Large area swipes are used to detect removable surface radiological contamination. Swipes will be performed by firmly wiping an area greater than 100 square centimeters (cm<sup>2</sup>) but not exceeding 1 square meter with a soft absorbent material (i.e., Kimwipes). The monitoring will be completed by using a Ludlum Model 12-1A to monitor that area of the swipe material that contacted the potentially contaminated surface. The swipe being monitored should be relatively flat as it is being screened.

Monitoring results greater than 300 dpm/100cm<sup>2</sup> from a large area swipe as indicated by monitoring with a Ludlum Model 12-1A will be considered indicative of the presence of radiological contamination and will necessitate locating the contamination on the surface being monitored by the large area swipe. The contamination will be located by monitoring the surface with a Ludlum Model 12-1A as described in Subsection 6.3.1.1. Decontamination procedures for various items are contained in the SOPs listed in Subsection 4.2

Environmental materials found to have an activity greater than 300 dpm/100m<sup>2</sup> as indicated by the Ludlum Model 12-1A will be treated as low-level radioactively contaminated environmental materials. Swipes found to have an activity less than 300 dpm/100m<sup>2</sup> will be handled as uncontaminated environmental materials.

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### 6.2.13 Monitoring With A Small Area Smear

Monitoring small areas with smear paper and counting the smears in the Ludlum Model 43-10-1 alpha sample counter is the accepted monitoring technique for HSS use. Whenever radioactive contamination is detected during the monitoring tasks described in Subsection 6.2.2, small area smears will be done to verify removal of that contamination. Small area smears may be taken from wet surfaces provided that the smears are dried before being counted. A heat lamp may be used to speed the drying process prior to counting.

Use caution when smearing rough surfaces so as not to abrade or tear the smear paper. Damaged smear paper might not provide a representative level of the contamination present. Prior to use, a small "X" will be made with a pencil on the face of the small area smear paper that will contact the surface being monitored. Hold the smear paper between the thumb and fingers, with the back of the smear against the fingers. Place the face of the smear paper against the surface to be smeared. Apply moderate pressure across the smear to ensure that at least one half of the face of the smear comes in contact with the surface being surveyed. Wipe (smear) an area of approximately 100 cm<sup>2</sup> (approximately a 4 inch by 4 inch square). Rotate the smear paper one-half turn and smear the same area again. All smear papers will be handled carefully to avoid cross-contamination and will be identified as to the location/surface smeared, placed in a glassine envelope, and transferred to the Ludlum Model 43-10-1 alpha sample counter for counting after the smear paper is removed from the fold-over envelope or glassine envelope.

Small area smears that indicate an activity level of greater than 20 disintegration per minute (dpm) as measured with a Ludlum Model 43-10-1 alpha sample counter and Ludlum Model 2000 scaler/timer will be considered as indicative of potential radioactive contamination. Decontamination procedures are contained in the SOPs listed in Subsection 4.2.



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Small area smear papers will be treated as low-level radioactively contaminated environmental materials

### 6.2.2 Monitoring Tasks

Radiological Engineering-approved subcontractor Health and Safety Specialists will monitor environmental materials containers, sample containers, equipment, and personnel exiting potentially contaminated work areas and work areas characterized as not potentially contaminated if monitoring by subcontractors indicates the potential presence of radiation contamination above background. Radiological Engineering-approved subcontractor Health and Safety Specialists will also conduct prework area monitoring of potentially contaminated work sites. Prework area monitoring will be scheduled with a Radiological Engineering-approved subcontractor Health and Safety Specialist as far in advance as possible. A minimum notice of one workday is required.

#### 6.2.2.1 Work Areas

Work area monitoring will be accomplished (prior to work starting) to indicate if surficial radioactivity exists in the immediate work area. Prework area monitoring will be accomplished by making direct soil surface measurements with a Bicon Analyst Fidler (or equivalent instrument). A minimum of 17 measurement points will be used for a prework area survey. A grid of the measurement points that is centered on the point of the intrusive activity is depicted in Figure FO 16-1. A measurement of 250 cpm or less as measured by a Bicon Analyst Fidler (or equivalent instrument) indicates only background levels of radioactivity are present. At surface sediment sampling sites a single monitoring with a Bicon Analyst Fidler (or equivalent instrument) at the sampling point will constitute prework area monitoring. Documentation of area monitoring will be accomplished by completing Section I of Form FO 16A, Results of Radiological Measurements In The Field.

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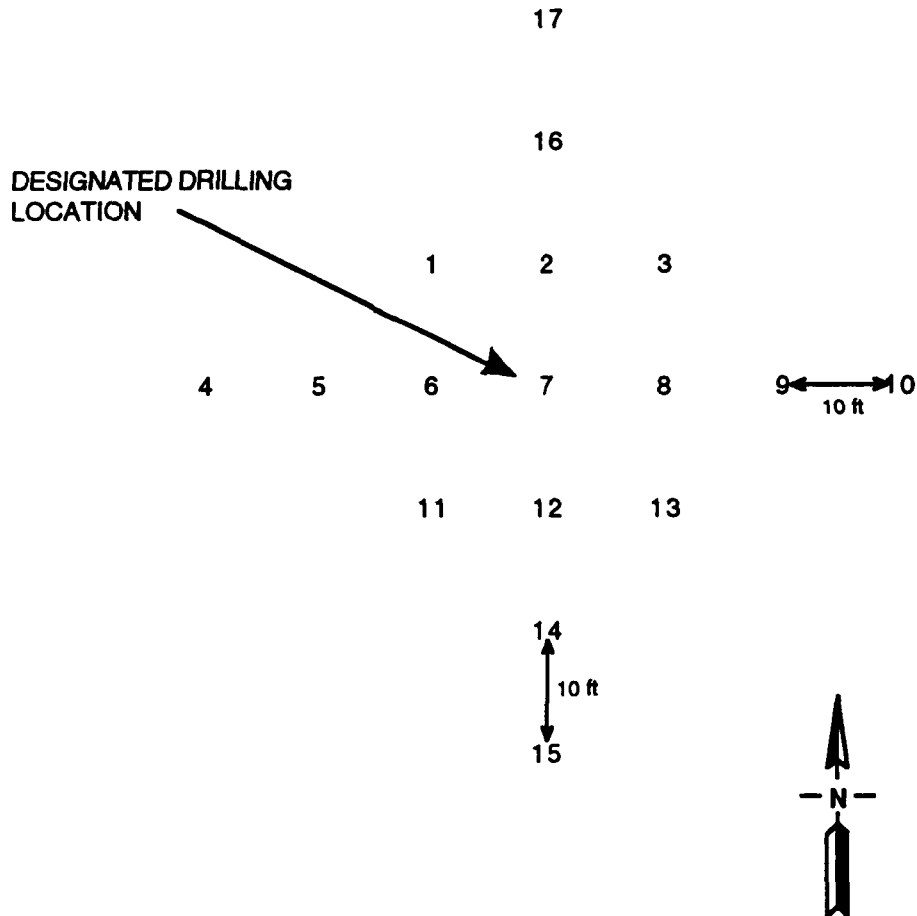
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### MINIMUM MEASUREMENT POINTS FOR A PREWORK RADIATION SURVEY (# = Measurement Point)



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At the designated drilling location, the Ludlum 12-1A will be used for a single measurement as described in SOP GT 2, Drilling and Sampling Using Hollow Stem Auger Techniques. Areas with measurements greater than 300 dpm/100cm<sup>2</sup>, but less than 3000 dpm/100cm<sup>2</sup> will be classified as Controlled Areas. Areas with measurements greater than 3000 dpm/100cm<sup>2</sup> will be classified as Radiological Controlled Areas. For measurements above 300 dpm/100cm<sup>2</sup> additional guidance can be found in manual EMD-3-21000 OPS, EMRG 1.3, Posting of Radiation Protection Requirements.

### 6.2.2.2 Environmental Materials

6.2.2.2.1 Drilling Cuttings During soil boring and well construction, the point of intrusive activity will be monitored with the Bicon Analyst Fidler and/or a Ludlum 12-1A (or equivalent instruments) before the auger bit is set on the ground.

Normally, as the auger starts rotating, the soil cuttings will be wetted as they are generated, and the wetting process will preclude monitoring of the soil cuttings with a Ludlum Model 12-1A. However, each time the auger is stopped for the addition of another auger flight, the accumulated core or wetted soil cuttings will be monitored. If drilling cores are not samples, as the augers begin rotating again, a small (approximately 1 cup) sample will be collected from the dry soil cuttings brought to the surface before the wetting process begins. The sample of dry soil cuttings will be spread evenly over a surface known (by prior monitoring) to be free of radiological contamination and monitored with the Bicon Analyst Fidler and/or the Ludlum Model 12-1A. Drilling cutting's monitoring results will be recorded on Form FO 8A, Field Monitoring Results of cuttings and core, as described in SOP FO 8, Handling of Drilling Fluids and Cuttings.

If the soil cuttings being generated are wet as they appear at the ground surface, monitoring those cuttings with a Ludlum Model 12-1A will not produce useful data.

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Therefore, either the Bicron Analyst Fidler or small area smears from the interior of the split-spoon sampler will be used

**6.2.2.2.2**      **Environmental Materials Containers**    Sealed environmental materials containers will be monitored in the work area if the work area was characterized as potentially radiologically contaminated by EG&G site characterization. Sealed environmental materials containers used in an area characterized by an HSS as uncontaminated will also be monitored in the work area if the potential presence of radioactive contamination was indicated during any of the monitoring tasks conducted as field work progressed.

If the environmental materials containers are dry, the top and side will be monitored with a Ludlum Model 12-1A. When monitoring the sides, the long axis of the Ludlum probe will be held parallel to the long axis of the environmental materials container. If the environmental materials container is wet, the top and sides will be monitored with small area smears.

After decontamination at the main decontamination facility, sealed environmental materials containers will be monitored with small area smears if the containers were found to be radioactively contaminated during monitoring tasks completed in the field. Four small area smears will be conducted around the side of the top one-third of each drum. The four small area smears will be spaced around the drum so that each individual small area smear is approximately 90° around the drum from the nearest adjoining small area smear site. Documentation of environmental materials container monitoring will be accomplished by completing Section II of Form FO 16A, Results of Radiological Measurements In The Field.

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### 6.2.2.3 Samples

Drilling cores that are dry will be monitored with the Ludlum Model 12-1A after the split-spoon sampler is opened. If the drilling core is wet, a small area smear will be conducted on the interior side of the empty half of the split-spoon sampler. The results of each core monitoring will be assigned to the core number that represents the core screened. Any radiological measurement of the core sample greater than background will be documented on Form FO 16A, Results of Radiological Measurements in the Field. The measurement will be validated and the final results noted. The final result will also be documented on Form FO 8A, Field monitoring Results of Cuttings or Core.

In potentially radiologically contaminated work areas and in not contaminated areas where field radiological monitoring conducted during intrusive activities (see SOP FO.8, Handling of Drilling Fluids And Cuttings) revealed the potential for radioactive contamination, a small area smear of the exterior of the sample container will be taken. The small area smear counting results will be used to verify decontamination of the sample container. Documentation of sample monitoring will be accomplished by completing Section III of Form FO 16A, Results of Radiological Measurements In The Field.

Core intervals obtained from within known IHSSs, the Americium Zone, Identified Groundwater Plume areas, Protected Areas, and in areas where surface contamination has been detected, will be monitored and the results recorded. If the space provided is insufficient to record all the monitoring results, additional core monitoring results will be recorded on the reverse side of the form, and an annotation made on the front of the form regarding the location of additional results.

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### 6.2.2.3.1 Monitoring in Bedrock

The following requirements will apply during bedrock drilling when the alluvium has been isolated from bedrock at sites in non-IHSS areas when all these conditions apply

- there has been no historical radiological contamination
- surface radiological contamination was not detected during the pre-work site survey
- no radiological contamination was detected while drilling in the alluvium

When the alluvium has been isolated from the bedrock as per SOP GT.3, Isolating Bedrock from Alluvium with Grouted Surface Casing, the exclusion zone will be kept for safety and site control purposes only. Egress from the area will be allowed without field decontamination and radiological screening of personnel or equipment. Swipe sampling will be performed on the interior of each core barrel to properly determine core handling procedures.

If radiological contamination was encountered during monitoring of the alluvial core or cuttings, these materials will be handled as per sections 6.2.2.1 and 6.2.2.3. Periodic swipe samples will be taken of downhole equipment as a control measure. Periodic screens of personnel will be conducted at a minimum of twice daily and an end-of-day personnel frisk will be performed to insure that if any contamination is present, it does not leave the site via workers.

### 6.2.2.4 Equipment

**6.2.2.4.1 Heavy Equipment** Heavy equipment will be monitored in the field if the heavy equipment was used in an area characterized as potentially radiologically contaminated or in an area characterized as not potentially contaminated where monitoring tasks indicated the potential presence of radiological contamination. Surfaces that have been in direct contact

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with soil will be monitored with a Ludlum Model 12-1A after contamination-reduction activities have been accomplished as described in SOP FO 4, Heavy Equipment Decontamination. Special attention will be paid to the tires/tracks, augers, etc.

Heavy equipment found to be radioactively contaminated in the field will undergo contamination reduction activities in the field. If contamination cannot be removed, the heavy equipment will be brought in a trailer to the decontamination facility and decontaminated. After decontamination, the equipment will be monitored with small area smears to verify the decontamination process. The small area smears will be accomplished regardless of the results of field monitoring after contamination reduction activities in the field.

Documentation of all heavy equipment monitoring will be accomplished as described in SOP FO 4, Heavy Equipment Decontamination.

### 6.2.2.4.2

**General Equipment** General equipment that has been in direct contact with soil will be screened with a Ludlum Model 12-1A. Large area swipes will be conducted on non-uniform objects and/or surfaces (such as odd shapes, inside surfaces, small items, etc.).

General equipment found to be radioactively contaminated in the field will be monitored by small area smears after final decontamination to verify the decontamination process. The small area smears will be accomplished regardless of the results of field monitoring after decontamination activities in the field.

Documentation of all general equipment monitoring will be accomplished as described in SOP FO.3, General Equipment Decontamination.

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**6.2.2.4.3**      Heat Lamps   Heat lamps may be used prior to counting to dry smears that have been wetted during field activities

### 7.0      DOCUMENTATION

Documentation will be maintained by the SSO concerning the results of radiological monitoring specified in this SOP. Form FO 16A, Results of Radiological Monitoring In The Field, will be used to record the required information. Form FO 8A, Field Monitoring Results of Cuttings or Core is provided to assist in the documentation of the drilling core sampling. As described in Subsection 6.2.2.3, Form FO 16A will be used, if any initial radiological measurement is greater than background. The validation results will be noted. The final validation results will be documented on Form FO 8A, as well.



## RESULTS OF RADIOLOGICAL MEASUREMENTS IN THE FIELD

**Project Name** \_\_\_\_\_

Date \_\_\_\_\_ Site Number \_\_\_\_\_

**Snow Cover Present (Y/N)** \_\_\_\_\_ **Work Surface Wet (Y/N)** \_\_\_\_\_

## 1 Instruments Used and Background Readings

Manufacturer and Model No	Serial Number	Probe Type	Probe Serial No	Calibration Due Date	Background Reading (cpm)

## 2 Prework Monitoring Results (Ludlum 12)

\_\_\_\_\_ cpm at Point of Intrusive Activity      \_\_\_\_\_ Highest Measured cpm

### 3 Sample Monitoring Intervals Monitored and Associated Samples

[illegible]

**Completed By** \_\_\_\_\_  
**Print Name**                      **Signature**                      **Date**

Subcontractor \_\_\_\_\_

**RESULTS OF RADIOLOGICAL MEASUREMENTS IN THE FIELD**

Project Name \_\_\_\_\_

Date \_\_\_\_\_ Site Number \_\_\_\_\_

Snow Cover Present (Y/N) \_\_\_\_\_

**1 Instruments Used and Background Readings**

Manufacturer and Model No	Serial Number	Probe Type	Probe Serial No	Calibration Due Date	Background Reading (cpm)

**2 PPE Monitoring**

\_\_\_\_\_ PPE monitoring not required Work area was characterized as uncontaminated and field radiological screening as work progressed did not indicate the presence of potential contamination

If PPE monitoring required complete the following table

Ludlum Model 12	Bicron Analyst Fidler	PPE screening resulted in verified positive reading (Y/N)	Time	PPE Verified positive reading (cmp)	Smear No.

Completed By \_\_\_\_\_  
Print Name Signature Date

Subcontractor \_\_\_\_\_

This is a  
**CONTROLLED DOCUMENT**

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This is a RED Stamp ENVIRONMENTAL SAMPLE RADIOACTIVITY CONTENT SCREENING

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TITLE  
ENVIRONMENTAL SAMPLE  
RADIOACTIVITY CONTENT  
SCREENING

Approved By

  
(Name of Approver)

MAY 12 1992

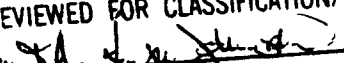
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REVIEWED FOR CLASSIFICATION/UCNI  
By   
Date March 11, 1992

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### **2.0 PURPOSE**

This procedure is intended to ensure that the samples collected as part of the Environmental Management (EM) Division activities are handled, transferred, and shipped in a manner consistent with their actual or projected radioactivity content/concentration. This procedure addresses

- Applicable regulations/requirements
- Contractual agreements, and
- EG&G Rocky Flats Plant (RFP) policies, procedures, and requirements

Proper radioactive content screening for shipment/transfer of samples to the appropriate laboratory is outlined. The procedure also addresses restrictions on the selection of the laboratory for screening and sample analysis based on the criteria for shipping and the limitations of the laboratory (e.g. license restrictions). The screening process is summarized in the flow diagram in Figure FO 18-1.

### **3.0 SCOPE**

This procedure will be used by qualified subcontractor and EG&G personnel to select laboratories for screening and analysis of samples collected during EM activities. The procedure includes input for the selection of packaging and documentation for shipment, as related to radioactive material.

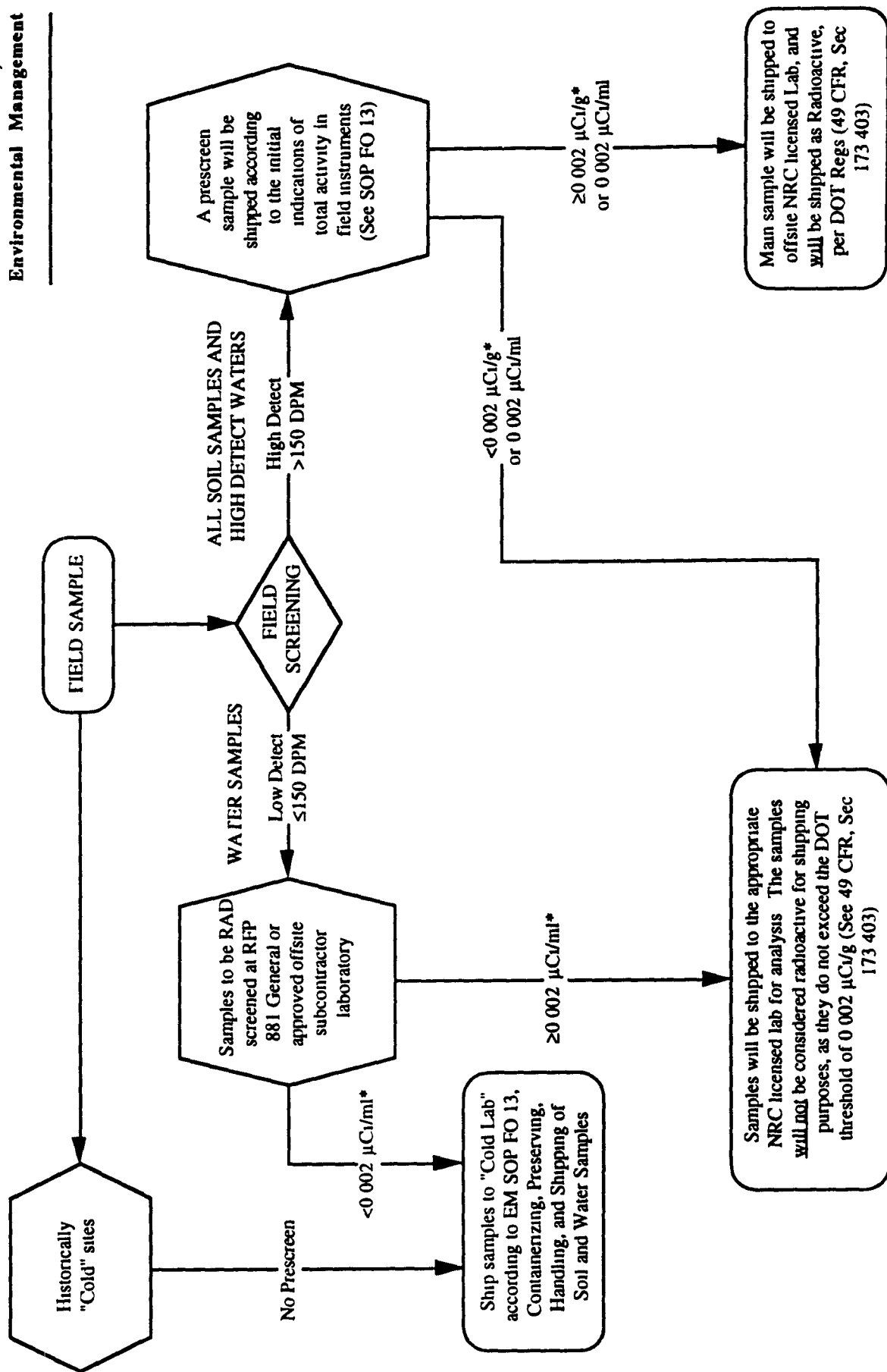
### **4.0 REFERENCES**

#### **4.1 SOURCE REFERENCES**

DOE Order 5400.6, "Radiation Protection of the Public and the Environment"

**FIGURE FO.18-1**  
**SCHEMATIC OF RADIATION PRESCREENING**

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\* Total alpha/beta activity

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DOE Order 5490 11, "Radiation Protection of Occupational Workers "

10 CFR 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material" (or equivalent agreement State requirements)

10 CFR 40, "Domestic Licensing of Source Material" (or equivalent agreement State requirements)

10 CFR 70, "Domestic Licensing of Special Nuclear Material" (or equivalent State requirements)

49 CFR, "Transportation," Subpart I-Radioactive Materials, Sections 173 401 to 173 478

EG&G Rocky Flats Plant "Site-Wide Quality Assurance Project Plan for CERCLA Remedial Investigations/Feasibility Studies and RCRA Facility Investigations/Corrective Measures Studies Activities "

EG&G Rocky Flats Plant Transportation Manual, Traffic Department

EG&G Rocky Flats Plant Health & Safety Procedures Manual

#### 4.2 INTERNAL REFERENCES

A related SOP cross-referenced in this procedure is

- FO 13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples

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### 5.0 PREREQUISITES

Determine the projected upper limit activity for sample locations, based on historical data for the locations. Areas for which no historical data are available must be screened according to this procedure

Identify the potential analytical laboratories for aliquot screening and sample analysis based on direction from EG&G Radioanalytical Program Chemist. Arrange for the completion of the aliquot screen and sample shipment to appropriate laboratory

If sampling involves entry into radiological areas or sampling of potentially contaminated materials, follow the Health and Safety procedures for entry and/or sampling in these areas. Radiological Engineering-approved subcontractor Health and Safety Specialists support is required for sampling on RFP. Arrange for Radiological Engineering-approved subcontractor Health and Safety Specialists support, as needed, based on the planned sampling locations

### 6.0 LIMITATIONS AND PRECAUTIONS

Samples with total activity  $\geq 0.002 \mu\text{Ci/g}$  must be shipped "Radioactive" and in compliance with the applicable EG&G RFP requirements listed in the EG&G RFP Transportation Manual and the Plant Health and Safety Procedures Manual

Environmental samples are considered non-radioactive unless historical data or sample screening indicates a total activity greater than  $0.002 \mu\text{Ci/g}$ .

When entering a radiological area, follow all applicable Health and Safety postings, practices, procedures, and instructions. This includes considerations to assure that all radiation exposures (internal and external) are "as low as reasonably achievable" (ALARA)

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When implementing the activities in this procedure assure that the chain-of-custody (COC) of the samples is maintained (see RFP Health and Safety Procedures Manual and SOP FO 13, Containerizing, Preserving, Handling, and Shipping of Soil and Water Samples)

### 7.0 PROCEDURE

#### 7.1 SUMMARY

Radiological screening and classification of samples is performed to determine which samples may be analyzed by non-licensed laboratories, establish radiation work requirements, and to evaluate sample activity in terms of license and shipping limits

#### 7.2 ANALYSIS/OPERATION

##### 7.2.1 Selection of Samples for Screening

Sample screening will be performed on the following types of samples from the RFP facility

- Samples to be shipped to nonlicensed laboratories, unless an exception is made as stated below
- Materials that are classified as waste. These materials are usually contained in drums, tanks, or ponds. A wide variety of matrices are encountered including liquids (often multi-phased), sludges, and heterogeneous solids
- Samples of materials from process streams where radioactive materials are utilized



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- Environmental samples from within the controlled areas of the RFP facility. These samples include soil, sludges, sediments, and water. Controlled areas are defined as areas where there is a reasonable risk for exposure to radiological health hazards.

Sample screening is not required for the following types of samples from the RFP facility:

- Filters, charcoal tubes, impinger solution, etc. from samples collected to measure ambient or breathing zone concentrations of airborne contaminants.
- Bioassay samples.
- Samples of plant or animal life (biota).
- Environmental samples including soil, sediments, and water from the environs outside RFP's controlled areas.
- Drinking water samples.

Samples shall be collected, shipped, stored, identified, and documented in an ordered sequence as shown in the Radiation Screening Schematic, Figure FO 18-1. A sample suite is collected in the field that includes a sample designated for radiation screening (RAD screen) when no historical data is available for a specific site.

The RAD screen is packaged and shipped to a licensed laboratory that is aware of the potential for radioactivity. The remainder of the sample suite is appropriately stored, pending the RAD screen analysis and categorization. COC procedures are observed for analytical activities.

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Samples shall undergo field screening and shall be segregated as low detect ( $\leq 150$  DPM) or high detect ( $> 150$  DPM) as shown in Figure FO 18-1

Water samples with  $\leq 150$  DPM will be screened by the 881 General Lab per the L-6114 Procedure for Gross Alpha/Beta by an approved offsite subcontractor

For water samples with activity  $> 150$  DPM and for all soil/sediment samples, an aliquot shall be shipped to an appropriately licensed laboratory for screening.

As indicated in Figure FO 18-2, Classification of Samples, if the screen results in a total activity value of less than  $0.002 \mu\text{Ci/g}$  and a gross alpha activity of  $< 0.01 \mu\text{Ci/sample}$  and gross beta activity of  $< 0.1 \mu\text{Ci/sample}$ , the sample may be shipped to an unlicensed laboratory for analysis. These samples shall be designated as Category I type. Category I samples are nonradioactive as defined by DOT. Categories are based on activity per sample container. DOT shipping classifications are based on activity per package.

Category II samples may be nonradioactive, Limited Quantity, or Type A. Category II samples which are nonradioactive shall be shipped in the same manner as Category I samples. However, nonradioactive Category II samples MUST be shipped to a licensed laboratory. Limited Quantity and Type A samples must be shipped following specifications set forth in 49 CFR 173.421 and 173.421-1 and the appropriate Plant policies.

If the screen results in a total activity of  $< 0.01 \mu\text{Ci/g}$  and a gross alpha activity  $\geq 0.01$  but  $< 0.1 \mu\text{Ci/sample}$  and a gross beta activity of  $\geq 0.1$  but  $< 1 \mu\text{Ci/sample}$ , the sample shall be shipped to an appropriately licensed laboratory. These samples are designated as Category II type. If the sample is Limited Quantity, the outside of the container shall be marked "RADIOACTIVE" and appropriately shipped to a licensed laboratory per the instructions in 10 CFR 40, Domestic Licensing of Source Materials and the RFP Site-Wide QAPjP. (See Figure FO 18-2.)

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Upon completion of the RAD screen at the designated laboratory, results are documented for transmittal to the sample coordinator. Results shall be sent by facsimile to the appropriate sampling coordinator. Results shall include the Sample Screening Release Form, Form FO 18A (see Section 8.0, Documentation) and the computer generated Form FO 18B, Sample Screening Form. These forms, along with any calculations performed by the sample coordinator, shall be retained by the subcontractor as QA documents.

The laboratory staff member with responsibility for reporting transmits the RAD screen results to the sample coordinator. The sample coordinator receives a facsimile of the results. Each subcontractor shall maintain a dedicated FAX for the purpose of receiving RAD screen results during the hours of 4:30pm to 6:00pm Mountain Time.

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FIGURE FO.18-2  
CLASSIFICATION OF SAMPLES\*

CATEGORY I
gross alpha <0.01 $\mu\text{Ci}/\text{sample}$ gross beta <0.1 $\mu\text{Ci}/\text{sample}$ total activity <0.002 $\mu\text{Ci}/\text{gram}$

CATEGORY II Limits per Sample
<0.1 mR/hr Contact
<0.01 $\mu\text{Ci}/\text{g}$ Total Activity
Gross Alpha** $\geq 0.01$ but <0.1 $\mu\text{Ci}/\text{sample}$ Gross Beta** $\geq 0.1$ but <1 $\mu\text{Ci}/\text{sample}$
Follow safe lab practices for handling radioactive materials

- \* Sample classification is determined by comparing sample screening results to category limits. If screening results exceed any of the limits for a given category, the results should then be compared to the limits of the next higher category.
- \*\* If the radiological contaminants in the sample are known to be only U-natural, U-238, Th-natural, Th-232, (or their daughters) or H-3, the classification should be based on 10 times the limits given above. For example, Category III limits for U-238 would correspond to a gross alpha activity of 1  $\mu\text{Ci}$  or a gross beta activity of 10  $\mu\text{Ci}$ .

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The shipping clerk documents the shipping destination of the samples on the Sample Screening Release Form, Form FO 18A (see Section 8 0, Documentation)

The sampling coordinator will provide the screening results to the shipping clerk

These samples are not considered radioactive for shipping purposes if they do not exceed the DOT threshold of 0 002  $\mu\text{Ci/g}$  (See EG&G RFP Transportation Manual)

Irrespective of the requirements listed above, the respective Laboratory Radiation Officer has the final authority to determine which samples will be screened prior to shipment to that lab

### **7.2.2 Selection of Approved Screening Methods**

The sample screening method selected shall be appropriate for the types of radiological contaminants present in the sample

The analytical detection limit for the screening method selected shall be adequate to detect gross alpha activity of 0 01  $\mu\text{Ci/sample}$  and gross beta activity of 0 1  $\mu\text{Ci/sample}$  when the concentration is multiplied by the sample volume (or mass)

An example of an approved screening method for Waters/liquids/soils is

- A homogenized sample aliquot (approximately 4 mls for liquids and 1 gram for soils) is placed on a tared planchet and dried under a heat lamp. The aliquot is brought to a constant weight at room temperature and counted for gross alpha/beta activity with a gas flow proportional counter

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Laboratories performing screening will be required to submit for approval to the Radioanalytical Program Chemist SOPs which encompass the following

- Radiological Screening and Classification of Samples
- Calibration and Operation of Gas Flow Proportional Counters
- Calibration and Operation of a Germanium Gamma Spectrometer

Additional methods may be used but must be adequately documented in standard operating procedures and shall specify the method detection limits

Screening data shall be transmitted to the receiving laboratory in the following format

- Sample identification,
- Total specific activity of the sample in units of  $\mu\text{Ci/g}$ ,
- Gross alpha/beta activity in units of  $\mu\text{Ci}$ ,
- Isotopic analysis in units of  $\mu\text{Ci}$  may be substituted for gross alpha/beta activity if all sample radioactivity is accounted for by this method

### 7.2.3 Classification of Samples

Samples shall be classified based upon the total alpha/beta activity of the sample, the specific activity, and for Category II samples, the preceding plus the contact exposure rate. Determination of DOT Radiological Shipping classification for sample shipping may be determined by utilizing the following examples.

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### Example I.

Sample #BH0001WC      Matrix: Soil      Sample Size 500 grams

Specific Alpha Activity (SA) =  $1.72 \times 10^{-4}$  uCi/g

Specific Beta Activity (SB) =  $4.65 \times 10^{-4}$  uCi/g

### Screening Classification

Gross alpha activity (uCi) = SA (uCi/g) x Sample Size (g)

Gross alpha =  $1.72 \times 10^{-4}$  uCi/g x 500g

Gross alpha = 0.09 uCi

Gross beta activity (uCi) = SB (uCi/g) x Sample Size (g)

Gross beta =  $4.65 \times 10^{-4}$  uCi/g x 500g

Gross beta = 0.23 uCi

Total Specific Activity = SA + SB =  $1.72 \times 10^{-4}$  uCi/g +  $4.65 \times 10^{-4}$  uCi/g  
=  $6.37 \times 10^{-4}$  uCi/g

Gross alpha > 0.01 uCi

Gross beta > 0.1 uCi

Total Specific Activity > 0.002 uCi/g,

therefore Category II and SHIP TO LICENSED LABORATORY

### DOT SHIPPING CLASSIFICATION

Specific Activity < 0.002 uCi/g, therefore DOT NON-RADIOACTIVE

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### Example II

Sample #TR00001IT

Matrix: Soil

Sample Size 500 grams

Specific activity alpha (SA) =  $7.78 \times 10^{-5}$  uCi/g

Specific activity beta (SB) =  $1.12 \times 10^{-4}$  uCi/g

### Screening Classification

Gross alpha activity (uCi) = SA (uCi/g) x Sample Size (g)

Gross alpha =  $7.78 \times 10^{-5}$  uCi/g x 500 grams

Gross alpha =  $3.89 \times 10^{-2}$  uCi

Gross beta activity (uCi) = SB (uCi/g) x Sample Size (g)

Gross beta =  $1.12 \times 10^{-4}$  uCi/g x 500 grams

Gross beta =  $5.6 \times 10^{-2}$  uCi

Total Specific Activity - SA + SB

Total specific activity =  $7.78 \times 10^{-5}$  uCi/g +  $1.12 \times 10^{-4}$  uCi/g

Total specific activity =  $1.90 \times 10^{-4}$  uCi/g

GROSS ALPHA > 0.01 uCi BUT < 0.1 uCi (0.0389 uCi)

Gross beta < 0.1 uCi

Total Specific Activity < 0.002 uCi/g therefore CATEGORY II SAMPLE

### DOT SHIPPING CLASSIFICATION

Specific Activity < 0.002 uCi/g therefore DOT NON-RADIOACTIVE



## ENVIRONMENTAL SAMPLE RADIOACTIVITY CONTENT SCREENING

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<b>EG&amp;G ROCKY FLATS PLANT</b>	<b>Manual:</b>	<b>5-21000-OPS</b>
<b>EMD MANUAL OPERATION SOP</b>	<b>Procedure No.:</b>	<b>FO.18, Rev. 1</b>
	<b>Page:</b>	<b>15 of 15</b>
	<b>Effective Date:</b>	<b>March 1, 1992</b>
<b>Category 2</b>	<b>Organization:</b>	<b>Environmental Management</b>

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Samples classified as  $<0.002 \mu\text{Ci}$  (Category I) are considered exempt from licensing requirements and may be transferred to non-licensed laboratories. These samples are of sufficiently low activity to require no special handling procedures.

Samples classified as  $>0.002 \mu\text{Ci}$  (Category II) shall be sent to licensed facilities. Both Category I and Category II samples may be non-radioactive and are exempt from DOT.

Extracts of samples shall be given the classification of the original sample. The laboratory radiation safety officer may elect to reclassify the extract based on additional measurements or on knowledge of the extraction procedure.

Samples shall not be released for analysis until properly classified.

### 8.0 DOCUMENTATION

The signature on Form FO 18A, Sample Screening Release Form and on Form FO18B, Radioactive Analysis Report, verifies and authenticates the completion of this procedure and the accuracy of the data/information recorded.

SAMPLE SCREENING RELEASE FORM*				
Matrix _____		COC# _____ SDG# _____ Batch# _____		
Client ID	Lab #	Total Activity in $\mu\text{Ci}$		
		Alpha	Beta	Other**

Below Category I Release Limits \_\_\_\_\_ yes \_\_\_\_\_ no

If no, specify the samples above Category I

\_\_\_\_\_

Precautions \_\_\_\_\_

\_\_\_\_\_

Approval for Release \_\_\_\_\_ Date \_\_\_\_\_

\* Form FO18B, Sample Screening Form (computer generated), must accompany this form.  
\*\* Other analysis may include Tritium, etc.



521000 OPS  
FO 4 Rev 2  
11 of 21  
March 1 1999  
Environment al Management

OPERABLE UNIT  
NO 2 BOUNDARY

EAST TRENCHES AREA

750 000  
+ 2084 000

MOUND AREA

903 PAD AREA

AREA OF POTENTIAL CONTAMINATION IN  
OU2 CONTAINING IHSS VOLATILE ORGANIC  
PLUMES IN ALLUVIAL GROUNDWATER AND  
THE AMERICIUM ZONE

US DEPARTMENT OF ENERGY

Pokey Flats Plant  
Canon Colorado

FIGURE FO 4-1

OPERABLE UNIT NO 2

POTENTIAL CONTAMINATED WORK  
AREAS IN OPERABLE UNIT NO 2

0 200 400  
SCALE 1"=400'

November 1990

OPERABLE UNIT  
NO 2 BOUNDARY

EAST TRENCHES AREA

750 000 + 2 084 000

MOUND AREA

903 PAD AREA

AREA OF POTENTIAL CONTAMINATION IN  
OU2 CONTAINING IHSSs VOLATILE ORGANIC  
PLUMES IN ALLUVIAL GROUNDWATER AND  
THE AMERICIUM ZONE

US DEPARTMENT OF ENERGY

Pecky Flats Plant  
Golden Colorado

FIGURE FO 10-1

OPERABLE UNIT NO 2

POTENTIALLY CONTAMINATED WORK  
AREAS IN OPERABLE UNIT NO 2

0 200 400

SCALE 1"=400'

NO embe 1990